

SUPPLEMENTS

Dietary food product intended to provide by taking powder, pill, capsule, tablet or liquid

PROTEIN	VITAMINS	MINERALS	ESSENTIALS
WHEY	VITAMIN B	CALCIUM	CREATINE
MILK	VITAMIN C	MAGNESSIUM	BCAAs & TYROSINE
CASIEN	(Water Soluble)	POTASSIUM	EAAs
EGG	VITAMIN A	CHLORIDE	GLUTAMINE
PLANT	VITAMIN D	SULFER	TAURINE
SOYA	VITAMIN E	TRACE MINERALS	CARNITINE
COLLAGEN	VITAMIN K	IRON	ARGININE
	(Fat Soluble)	MANGANESE	CITRULLINE MALLET
		COPPER	ZMA & GINSENG
		IODINE	CAFFEINE
		ZINC	ALA & CLA
		COBALT	FISH OIL
		FLOURIDE	FAT CUTTERS
		SELENIUM	PRE WORKOUTS
			ENERGY BOOSTERS
			TEST BOOSTERS

Foundation Course Syllabus

In the Foundation Course of Nutrition we are going to study the basic elements of nutritions which are essential to the survival of the body and to achieving desired fitness goals of the individuals. In this course you will get the basic know how regarding various factors involved in functions of the body

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- 6. Diet & How to Create Diet Plan
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CHAPTER 1

Water

Water is an essential for maintaining cellular homeostasis (balance, stability, etc) and life sustenance. Major portion of our body comprises water in the form of fluid. Drinking plain water is always best because it is calorie free, inexpensive and readily available. You lose water every day through your breath, urine, perspiration, sweat, bowel movements, etc. An adequate intake of water for average men is recommended roughly around 3 to 3.5 ltrs. And for women it's around 2.5 to 3 ltrs. Per day. If any one does intense or moderate physical activities then that person needs to drink an extra amount of water to compensate for the loss of water through sweating.

Role of Water in the Body

- 1. Regulating the body temperature through sweating and respiration.
- 2. Helps in delivery of oxygen and other essential nutrients all over the body.
- 3. Acts as a shock absorber for the brain and spinal cord.
- 4. Needed by the brain to manufacture hormones and neurotransmitters.
- 5. Forming of Saliva in mouth for digestion process purpose.
- 6. Lubricates the joints and is important for soft and supple skin.
- 7. Flushes out body waste.
- 8. Allows body cells to grow, reproduce and survive.
- 9. Supports physical activities. Studies showed "modest levels of dehydration can decrease performance level.
- 10. Blood volume is normally regulated by matching water intake and water output.

CHAPTER 2

Oxygen

Oxygen is required for all biochemical reactions and functional elements of the body. For performing almost all the biochemicals reactions the body utilizes oxygen. In the human body, oxygen is taken in through the respiration process in the lungs. It diffuses through membranes into the red blood cells. The hemoglobin group which consists of iron (to maintain proper RBC count in hemoglobin) binds and carries oxygen all over the body.

Oxidative phosphorylation is the main process to release an ATP. release ATP (Aerobic stage). For Ex.: Marathon Running

When Oxygen is absent to process ATP and the body requires energy, then using the "Lactate" body creates energy (Anaerobic stage). For Ex.: Sprint Running

Role of Oxygen in the Body

- 1. Performing biochemical reactions in the body mainly "energy production" called oxidation process.
- 2. "Detoxification" means clearing out cellular waste through the process called "oxygen reduction cycle"
- 3. Increased oxygen uptake improves alertness, memory and reflexes.
- 4. Needed by the brain to neurotransmitter signaling.

CHAPTER 3

SLEEP

Sleep is a naturally recurring state of mind and body which reduces interactions with surroundings. During sleep your body releases different types of hormones that help to repair cells and control the body's use of energy. Sleep plays a vital role in good health and wellbeing throughout your life. Getting enough quality sleep at the right times can help to protect your physical health, mental health, quality of life and safety. The way you feel while you are awake depends upon how you are sleeping. Sleep reduces stress and improves your mood. Sleep improves memory and increases productivity.

CHAPTER 4

Nutrition

Nutrition is a science of providing macro & micro nutrients to the body. Nutrition is the biochemical and physiological process by which an organism uses food to support it's life (In simple words the food you eat and the way it affects your health). There are five main classes of nutrients that the body needs and these are as below.

Macronutrients

- 9. Protein
- 10. Carbohydrates (Carbs)
- 11. Lipids (Fats)

Micronutrients

- 12. Vitamins
- 13. Minerals

We can provide proper nutrition through eating "Healthy Quality Food" called Diet & "Nutritional Supplements"

CHAPTER 5

Basic Information regarding Macro Nutrients Proteins, Carbohydrates & Lipids (Fats & Oil)

Proteins

Proteins are large bio or macro molecules that are combined with one or more long chains of Amino Acids. These molecules are composed of Carbon, Hydrogen, Oxygen and Nitrogen atoms. Proteins are created by linking together "Amino Acids" into protein links called polypeptide chains through the "Hydrolysis" process.

Types of Proteins

The three types of proteins are

- 1. Fibrous
- 2. Globular
- 3. Membrane.

Benefits of Protein Supplements

- 1. Protein helps to Build Muscle
- 2. It Repair Muscle Tissues
- 3. Maintain Muscle Mass
- 4. Making Enzymes and Hormones
- 5. Sometimes it is also used as an energy source.

Sources of Protein Food

- A. Lean Meats Beef, Lamb, Veal, Pork, etc.
- B. Poultry Chicken, Turkey, Bush Birds, etc.
- C. Fish & Sea Foods Fish, Prawns, Crab, Lobster, etc.
- D. Eggs
- F. Dairy Product Milk, Yoghurt, Cheese.
- G. Nuts & Seeds Almonds, Pine Nuts, Walnuts, Hazelnuts, Cashews, Pumpkin Seeds, Sunflower Seeds, etc.
- H. Legumes Beans All Beans, Lentils, Chickpeas, Split Peas, Tofu, etc.

I. Grain and Cereals

Sources of Protein Powders (Dietary Supplement)

A. Whey Protein Powder - Whey protein is one of the primary proteins found in dairy products; it's a by-product of the cheese making process. Whey protein provides substantial amounts of the essential amino acids that are needed to carry out the functions that the proteins perform in the body.

THREE TYPES OF WHEY PROTEINS

Whey Protein Concentrate - WPC contains some levels of carbohydrates (Lactose) & Fats. The percentage of protein in WPC depends on how concentrated it is. Concentration levels tend to have in-between 30% to 90%

Whey Protein Isolate - WPI is further processed to remove all the fat and lactose. WPI is usually at 90% of protein concentration.

Whey Protein Hydrolysed - WPH is considered to be the "Pre-digested" form of whey protein. It has already undergone a partial "Hydrolysis Process" Hydrolysis is the process necessary for the body to digest and absorb protein.

B. Egg White Protein Powder - This powder is made from dried egg whites.

C. Casein Protein Powder - Casein is a slow- digesting dairy protein. It releases amino acids slowly, so people Often take it before bed to help with recovery and reduce muscle breakdown while they sleep. It prevents the body from entering a catabolic state.

D. Plant Based Protein - Grains, Legumes and Seeds are typical sources of plant based proteins. It also called as Vegan protein. Pea, Brown Rice, Hemp and Soya are the common source of plant based protein powders.

E. Collagen - Collagen is a protein responsible for healthy joints and skin elasticity or stretchiness. It is in your bones, muscles and blood. To produce Collagen your body needs Proline (AA), Glycine (AA), Vitamin C, and Zinc with Copper. For hydrated & elasticity of skin, maintaining blood pressure & sugar level, stronger bones, thicker hair, healthier nails, reduce osteoarthritis pain & increase muscle mass everyone should require Collagen.

CHAPTER 6

Carbohydrates

Carbohydrate (Carbs) is a biomolecule composed with Carbon, Hydrogen, Oxygen atoms. Carbs are one of the main sources of energy to the body. Carbs are broken down into "Glucose" through the process called "Glycolysis" which utilizes energy in generating "ATP" (Adenosine Triphosphate) by cells which are used in performing day to day activities. If "Glucose" is not needed immediately, it can be stored as "Glycogen" in the liver and muscles. When glucose is absent in bloodstream, and then the body breaks down this glycogen to again in the form of glucose (Glycogenolysis Process) The body can also convert leftover glucose into "FAT" (after completing the body's energy needs and glycogen are not available in the bloodstream.

Types of Carbohydrates

1. Simple Carbs –

A. Monosaccharide (having 1 unit of sugar)

The simplest form of carbs found in glucose, fructose and galactose.

B. Disaccharides (Having 2 units of sugar)

Two units of monosaccharides are joined together which are found in sucrose, maltose and lactose (Starches).

2. Complex Cabs –

C. Oligosaccharides (Having 3 to 10 units of sugar)

Various short chains of monosaccharides are joined together which are found in fibers. They get digested in our large intestine by the bacteria.

D. Polysaccharides (more than 10 units of sugar)

Various long chains of monosaccharides are joined together.

Benefits of Carbohydrates

- 1. Body's main source of energy
- 2. Fuel of your organs
- 3. Food of your brain
- 4. Sparing protein to utilize as energy
- 5. Fullness of your muscle tissue.

Sources of Carbohydrate Food

Grain, Cereals, Beans, Milk, Corn, Fruits, and many more things.

Sources of Carbohydrates (Dietary Supplement)

Muscle mass gainer Powder – Protein to carbs ratio (1:7) (1:5) (1:4) & (1:3)

Various Protein Bars & Energy Drinks

CHAPTER 7

Lipids (Fats & Oil)

Lipids (Fats) are biomolecules composed with Carbon, Hydrogen, Oxygen atoms. Lipids are essential micronutrients in human nutrition. Lipids are crucial for several body functions (energy storehouse, solvent for fat soluble vitamins and crucial components of cell structure). Lipids are a generic term that includes "Triglycerides" (3 units of fatty acids)

Types of FATs

1. Triglycerides – A triglyceride is an easter derived from glycerol and three fatty acids. The common causes of high triglycerides are obesity and poorly controlled diabetes. You may have high triglycerides especially if you eat a lot of carbohydrate or sugary foods or drink a lot of alcohol.

These are some simple ways of lowering your triglycerides level

- 1. Limit your sugar intake
- 2. Follow low carb diet, eat more fiber
- 3. Exercise regularly and lose some body weight
- 4. Avoid trans fats
- 5. Increase your intake of unsaturated fats

2. Phospholipids - Phospholipids consist of a glycerol molecule and two fatty acids. The lipid provides barriers in cellular membranes to protect the cell. However an important function of the cell membrane is to allow selective passage of certain substances into and out of the cell. It also acts as a transporter of fatty acids towards the liver.

3. Sterol - Sterols have multiple ring structures. The well known sterol is cholesterol which is **essential to the structure of cell membranes and producing sex harmones, adrenel hormones, bile acids, and Vitamin D.** However cholesterol can be synthesized in the liver, so there is no need to consume it in diet. High deposition may build up in walls of arteries causing heart attack and stroke.

Benefits of FATs

- 1. Energy storehouse
- 2. Serve as structural building material of all membranes of cell and organs
- 3. Formation of cholesterol
- 4. Prostaglandin formation and role in inflammation
- 5. Chemical messenger and maintenance of temperature.

Sources of FAT Food

Vegetable oil, butter, whole milk, cheese and some meats.

Sources of FATs (Dietary Supplement)

Omega 3 - It is also called Omega 3 Fish Oil. It contains 3 polyunsaturated fatty acids. The term "polyunsaturated" refers to their chemical structure, as "poly" means many and "unsaturated" refers to double bonds. Together they mean that Omega 3 fatty acids have many double bonds. The type of fat your body is not able to make, but it is very essential fat hence required to consume in supplementation.

Suggested dose is not more than 3g per day of EPA & DHA combined.

- 1. Alpha Linolenic Acid
- 2. EPA (Eicosapentaenoic Acid)
- 3. DHA (Docosahexaenoic Acid)

Benefits of Omega 3

- 1. Reduce symptoms of depression
- 2. Decreasing liver fat and fighting inflammation
- 3. Brain development and function
- 4. Improving heart and mental health
- 5. Slowing the development of plaque in the arteries
- 6. Reduce the chance of abnormal heart rhythm

CHAPTER 8 Basic Information regarding Micro Nutrients Vitamins and Minerals CHAPTER 8 - A (VITAMINS)

Vitamins

Vitamins are a group of substances that are needed for normal cell function, growth, and development.

There are 13 essential vitamins. This means that these vitamins are required for the body to work properly. Vitamins are grouped into two categories:

- Fat-soluble vitamins are stored in the body's fatty tissue. The four fat-soluble vitamins are vitamins A, D, E, and K. These vitamins are absorbed more easily by the body in the presence of dietary fat.
- There are nine water-soluble vitamins. They are not stored in the body. Any leftover water-soluble vitamins leave the body through the urine. Although the body keeps a small reserve of these vitamins, they have to be taken on a regular basis to prevent shortage in the body. Vitamin B12 is the only water-soluble vitamin that can be stored in the liver for many years.
- Vitamin A (carotenoids / retinoids)
- Vitamin D (calciferols)
- Vitamin E (tocopherols)
- Vitamin K
- Vitamin C (ascorbic acid)
- Vitamin B1 (thiamine)
- Vitamin B2 (riboflavin)
- Vitamin B3 (niacin)
- Vitamin B5 (Pantothenic acid)
- Vitamin B6 (pyridoxine)
- Vitamin B7 (Biotin)
- Vitamin B9 [Folate (folic acid)]
- Vitamin B12(cyanocobalamin)

Some "vitamin-like factors" are also needed by the body such as: Choline & Carnitine

Function

Each of the vitamins listed below has an important job in the body. Vitamin deficiency occurs when you do not get enough of a certain vitamin. Vitamin deficiency can cause health problems.

Not eating enough fruits, vegetables, beans, lentils, whole grains and fortified dairy foods may increase your risk for health problems, including heart disease, cancer, and poor bone health (osteoporosis).

- Vitamin A helps to form and maintain healthy teeth, bones, soft tissue, mucous membranes, and skin.
- Vitamin D is also known as the "sunshine vitamin" since it is made by the body after being in the sun. 10 to 15 minutes of sunshine, 3 times a week is enough to produce the body's requirement of vitamin D. People who do not live in sunny places may not make enough vitamin D. It is very hard to get enough vitamin D from food sources alone. Vitamin D helps the body absorb calcium. You need calcium for the normal development and maintenance of healthy teeth and bones. It also helps to maintain proper levels of calcium and phosphorus in the blood.
- Vitamin E is an antioxidant also known as tocopherol. It helps the body to form red blood cells and also helps in utilization of vitamin K.

- Vitamin K is needed because without it blood would not stick together (coagulate). Some studies suggest that it is important for bone health.
- Vitamin C, also called ascorbic acid, is an antioxidant that promotes healthy teeth and gums. It helps the body to absorb iron and maintain healthy tissue. It is also essential for wound healing, bone formation & collagen production. It also strengthens blood vessels.
- Vitamin B1 (Thiamine) helps the body cells change carbohydrates into energy. It is also essential for heart function and healthy nerve cells.
- Vitamin B2 (Riboflavin) works with the other B vitamins. It is important for body growth and the production of red blood cells.
- Vitamin B3 (Niacin) that helps maintain healthy skin and nerves. It also has cholesterol-lowering effects at higher doses.
- Vitamin B5 (Pantothenic acid) is essential for the metabolism of food. It also plays a role in the production of hormones and cholesterol.
- Vitamin B6 (Pyridoxine) helps form red blood cells and maintain brain function. This vitamin also plays an important role in the synthesis of proteins that are part of many chemical reactions in the body. The more protein you eat the more pyridoxine your body requires.
- Vitamin B7 (Biotin) is essential for the metabolism of proteins and carbohydrates, and in the production of hormones and cholesterol.
- Vitamin B9 (Folate) is necessary for production of red blood cells and for the synthesis of DNA (which controls and guides the cell its daily function) Any woman who is pregnant should be sure to get enough folate. Low levels of folate are linked to birth defects such as spina bifida.
- Vitamin B12 is important for metabolism. It also helps form red blood cells and maintain the central nervous system.
- Choline helps in normal functioning of the brain and nervous system. Lack of choline can cause swelling in the liver.
- Carnitine helps the body to change fatty acids into energy.

CHAPTER 8 - B (MINERALS)

Minerals

Minerals are important for your body to stay healthy. Your body uses minerals for many different jobs, including keeping your bones, muscles, heart, and brain working properly. **Minerals are also important for making enzymes and hormones.**

There are two kinds of minerals: Macrominerals and Trace minerals.

You need larger amounts of macrominerals. They include calcium, phosphorus, magnesium, sodium, potassium, chloride and sulfur.

- Calcium : Your body needs calcium to build and maintain strong bones. Your heart, muscles and nerves also require calcium to function properly.
- Phosphorus : Reduces muscle pain. Filter out waste in your kidneys. Produce DNA & RNA (Genetics)
- Magnesium : Reduces insulin resistance. It has anti-inflammatory benefits. Boost functional performance.
- Sodium : The human body requires a small amount of sodium to conduct nerve impulses, contract and relax muscles, and maintain proper balance of water & other fluid levels. High amounts of sodium may cause high blood pressure.
- **Potassium :** It helps to regulate fluid balance, muscle contraction, nerve signals and heart rhythms. It also **helps** to move nutrients into cells and waste products out of cells. Low potassium can make muscles weak, cramp, twitch or even become paralyzed.
- Chloride : It is the most important electrolyte in the blood. It helps to keep the balanced amount of fluid inside and outside of the cells. It also helps to maintain proper blood volume, blood pressure and pH of your body fluids (Acidic and Alkaline)
- Sulfur : The human body needs sulfur to build and fix your DNA and protect your cells from damage.

You only need small amounts of trace minerals. They include iron, manganese, copper, iodine, zinc, cobalt, fluoride and selenium.

- Iron : Iron helps to preserve many vital functions in the body including the immune system, gastrointestinal processes. It improves focus. The regulation of body temperature is also maintained by iron.
- Manganese : Helps in forming connective tissues, bones, blood clotting factors and sex hormones.
- **Copper :** It contributes to **iron absorption**. Together with iron it **enables the body to form red blood cells**.
- Iodine : Iodine ensures proper thyroid function. It helps to regulate the production of thyroid hormones "Thyroxine" (T4) and "Triiodothyronine" (T3)
- Zinc : Zinc is necessary for the activity of enzymes that aid in metabolism, digestion, nerve function and many more processes. Zinc helps to produce key sex homones "Testosterone and Prolactine" It may impact male sexual competency.
- **Cobalt** : Cobalt helps in forming amino acids. It also helps the **production of antibacterial and antiviral compounds** that prevents infections.
- Fluoride : Keep bones and teeth hard and strong. It is also important for preventing dental cavities.
- Selenium : Reduces asthma symptoms. Reduces certain risk of heart attack, cancers and other diseases.

Most people get the amount of minerals they need by eating a wide variety of foods. In some cases, your doctor may recommend a mineral supplement.

CHAPTER 9

Nutritional Supplements

Nutritional supplements are the products used to improve the diet. These products are developed to provide essential nutrients that may otherwise not be consumed in sufficient quantities in the food like proteins, vitamins, minerals, enzymes and other nutritional substances.

These products are usually available in the form of powder, capsules, tablets, pills, liquid or in other forms.

Some of these products also act as "antioxidants". Antioxidants are natural substances in food that might help to protect you from some diseases. Foods like "Beta-Carotene, Selenium, Vitamin C & E, etc.

Nutritional Supplements are Safe

The nutritional supplement products must have been **"manufactured under the specific quality standards"** set by the U.S. (FDA), FSSAI or FOSCOS (India), or that particular Food and Drug controlling authorities of respected countries where the product was manufactured. They must guarantee that the supplement facts on the label are accurate and that container holds what it says it does.

The supplement that seemed to help your neighbor, friend or relative might not work for you, hence purchasing it with "checking the science, your body type and according to your desired fitness goal".

Some products are also available with "Product Testing Lab Reports"

People take dietary supplements for a number of reasons, including

- 1. Maintain their general health
- 2. Improving their performance activity (for strength, endurance, flexibility, growth and recovery)
- 3. Improving mental performance.
- 4. Providing immune system support.

Steroids are drugs and that do not come under the nutritional supplement category.

Diet is a science of providing nutrition in balanced and adequate quantities. A healthy diet is essential for good health and nutrition. It protects you against many chronic noncommunicable diseases, such as heart disease, diabetes and cancer. Eating a variety of foods and consuming less salt, sugars and saturated fats.

Diet Plan

Healthy eating plan is called a diet plan. It includes all essential macronutrients and micronutrients covered in your meal. A diet plan is tailored to an individual's health status, weight and lifestyle, along with their health goals, **like Weight Gain**, **Muscle Gain**, **Weight Loss**, **Fat Loss or General Fitness**.

How to Create Diet Plan

- 1. Find out an individual's fitness goal (For preparing caloric surplus or caloric deficit diet plan)
- 2. Consider Metabolism (body type / body structure) & BMR
- 3. Find out workout and resting schedule
- 4. Find out a sleeping pattern.
- 5. Find out daily routine and schedule of work
- 6. Set the meal plan according to eating habits (3 to 6 meals) based on the calories needed.
- 7. Calculate & accommodate essential macro as well as micronutrients needed.
- 8. Set the water intake
- 9. Suggest dietary supplementation products if needed
- 10. Modifications and follow up

Calories, Metabolism are the basic pillars of diet.

Calorie

The calorie is a unit of energy defined as the amount of heat needed to raise the temperature of a quantity of water by one degree.

In a nutritional sense, all types of food are important sources of calories, which people need to live and function.

"Our brains, our muscles every cell in our body require energy to function in its optimal state,"

It means calorie is your "Energy Currency" which can be spent in performing the physical, mental & other activities.

Metabolism

Metabolism means the organic process by which your body converts your food into energy. In this process calories in food combine with oxygen to release the energy which your body needs to function. "Catabolism & Anabolism" are two categories of metabolism. Catabolism is the breakdown and Anabolism means construct or built.

The thyroid hormones (T3 & T4) regulate the metabolism activity.

Your body type entirely depends upon your metabolism. The reason why finding your metabolism body type is important is because of its role in your fitness routine. Your metabolism determines how your body converts calories into energy.

These are three body types

"Endomorph, Ectomorph and Mesomorph"

Endomorph: This body type is characterised by a **softer & rounder body** which has a slow metabolism, so it is easy for them to gain weight (mostly fat not muscle).

In fitness and training a blend of cardio and strength training can be recommended for them.

In nutrition Lower amounts of calorie diets including high amounts of protein are to be suggested.

Ectomorph: This body type is characterised by a **thinner and leaner body** which has a fast metabolism, so it is very difficult for them to gain weight.

In fitness and training a more focus on strength training (focus on big muscle groups rather than full body workouts) and small amounts of cardio can be recommended for them.

In nutrition Large amount calorie diets including high amounts of starchy foods (Complex carbs) are to be suggested.

Mesomorph : The **perfect athlete's body** which has a moderate metabolism. This is considered the ideal type for bodybuilding.

In fitness and training a more focus on strength training (focus on all muscle groups including isolation exercises) and small amounts of cardio can be recommended for them.

In nutrition, according to their fitness goal, amounts of calories are to be suggested. In general, portions of a meal should cover 40% from Protein, 40% from Carbohydrates and 20% from Fats.

What is BMR (Basal Metabolic Rate) & It's Importance in Diet

BMR is the number of calories your body uses to maintain basic life sustaining functions. It means how many calories your body burns each day to perform daily activities. Knowing BMR is important whether you want to maintain your weight, lose weight or even gain weight. Your BMR (or Maintenance calories) can help to determine what number of calories you should be eating in order to meet your fitness goals.

BMR is one of the key essential factors in preparing your diet plans.