Subjects and Pre-requisites:

- Pharmacology: the science of drugs.
- Anatomy: the science concerned with the structure of the body.
- Physiology: the science concerned with the functions of the body systems.
- Histology: the science concerned with the microscopic structure of the body tissues.
- Pathophysiology: the science concerned with the diseases associated with the body systems.

Levels of Organization of the Human Body:

- The smallest unit is the cell, Sequence: cell -> tissue -> organ -> system -> organism.

Types of Body Systems:

- Cardiovascular, Digestive, Endocrine, Integumentary, Lymphatic, Muscular, Nervous, Reproductive, Respiratory, Skeletal, Urinary.

Homeostasis:

- It is the ability of the human body to maintain the normal state of internal environment by maintaining balance in temperature, pressure etc.

  The homeostasis is maintained by feedback mechanisms.

Main Components of the Feedback Mechanism:

- Receptor: Detects changes in the internal environment.
- Controller: Receives messages from receptors and send messages to the effector in the form of hormones, nerve impulse or chemicals.
- Effector: Receives the message from the controller and respond.

Types of Feedback Mechanisms:

- Negative Feedback: A type of feedback that reduce the change in the internal environment.
- Positive Feedback: A type of feedback that increase the change in the internal environment.

Negative Feedback Examples:

- High Blood Pressure: Baroreceptors -> Brain -> Vasodilation, Reduced heart rate -> Decrease blood pressure.
- Low Blood Pressure: Baroreceptors -> Brain -> Vasoconstriction, Increase heart rate -> Increase blood pressure.
- High Blood Glucose: Glucose receptors on β-cells>Pancreas>Brain> β-cells release insulin -> Reduce blood glucose level.
- Low Blood Glucose: Glucose receptors on β-cells>Pancreas Brain>α-cells release glucagon > Increase blood glucose level.
- High Body Temperature: Thermoreceptors>Hypothalamus > Vasodilation, Sweating -> Restore normal body temperature.
- Low Body Temperature: Nerve cell endings -> Hypothalamus -> Vasoconstriction, Reduce sweating, Muscles shivering -> Restore normal body temperature.

Positive Feedback Examples:

- Uterus contraction during normal child birth: Head of baby pushes against cervix -> Brain -> Pituitary Gland releases Oxytocin -> Dilate the cervix, Increase uterine contractions.
- Blood clotting: Injury in the wall of a blood vessel -> Platelets -> Release of chemicals to stimulate clotting factors -> Blood clot formation and stop bleeding.