1. **Skeletal System**
   - Bone is made up of several different tissues
   - Each bone is actually an organ
   - Framework of bones and cartilage make up the skeletal system
   - OSTEOLOGY = study of bone structure and the treatment of bone disorder

2. **Outline**
   - Function of the Skeletal system
   - Structure of bone
   - Histology of bone
     - The Matrix
     - Cells in bone
     - Compact Bone Tissue
     - Spongy Bone Tissue

3. **Functions of Bone**
   - Protection
   - Assistance in movement
   - Mineral storage/homeostasis
   - Blood cell production = HEMOPOIESIS

4. **Structure of Bone**
   - Diaphysis
   - Epiphyses
   - Metaphyses
   - Articular Cartilage
   - Periosteum
   - Medullary Cavity
   - Endosteum

5. **Bone Matrix**
   - Organic matter - gives bone flexibility
     - Collagen protein
   - Inorganic mineral salts - in crystallized form - gives bone hardness
     - Hydroxyapatite = Calcium Phosphate
     - Calcium carbonate
     - Magnesium, sodium, potassium

6. **Bone cells**
   - Osteogenic Cells = Bone stem cells
Found in the periosteum, endosteum, and blood vessel spaces in the bone
- Mature to form Osteoblasts and Osteocytes

- **Osteoblasts** = bone building cells
  - Secrete collagen fibers and other organic compounds needed to build the matrix

- **Osteocytes** = mature bone cells
  - Maintain daily cellular activity of bone tissue

- **Osteoclasts** = bone destroying cells
  - Located in the Periosteum and endosteum.
  - Break down protein and mineral components of the matrix.

### Types of bone tissue

- **Compact Bone Tissue**
  - Forms external layer of ALL bones
  - Makes of the diaphysis of long bones

- **Spongy Bone Tissue**
  - Lies under compact bone
  - Where red marrow is found

### Compact Bone Tissue

*Figure 6.3 - page 165*

- Osteon (Haversian System) = basic structural unit
  - Lamella - concentric rings of matrix
  - Lacunae - spaces which contain osteocytes
  - Canaliculi - spaces filled with ECF connecting Lacunae. Contain osteocyte processes

- **Perforating (Volkmann’s) Canals**
  - Holes in the bone through which blood vessels, lymphatic vessels and nerves enter the bone
  - Connect Haversion Canals within compact bone

- **Central (Haversion) Canals**
  - Provides the osteocytes with nutrient exchange.
  - Osteocytes are connected via gap junctions

- **Interstitial Lamellae**

### Spongy bone

*Figure 6.4 - page 166*

- Makes up most of the bone tissue in short, flat, and irregularly shaped bones
- Forms most of the epiphyses of long bones
- Trabecula(e) = honeycomb structure
  - Structure similar to osteons
  - Receive nutrients from the blood flowing in the medullary cavities
- Spaces filled with red bone marrow