I. CELLS AND THE DEVELOPMENT OF CANCER 25%
   A. An Introduction to Cells
      1. Cell Structure
         a. Nucleus and DNA
         b. Organelles
         c. Cytoskeletal Elements and the Cell Membrane
      2. Cell Function
         a. General cell activities
         b. Differentiated cellular function
      3. The Cell Cycle and Cell Division
         a. Interphase (G1, S, G2)
         b. Mitosis (prophase, prometaphase, metaphase, anaphase, telophase) and cytokinesis
         c. Cell cycle checkpoints
      4. Cell Death
         a. Apoptosis
         b. Necrosis
         c. Other types of cell death
   B. The Development of Cancer
      1. Gene Changes
         a. Proto-oncogenes/oncogenes
         b. Tumor suppressor genes
         c. DNA repair genes
      2. Tumors
         a. The formation of tumors
         b. Tumor types
      3. Angiogenesis and Metastasis

II. CAUSES OF CANCER: THE ROLE OF GENETICS AND THE ENVIRONMENT 25%
   A. Genetics
   B. Age
   C. Obesity
      1. Insulin
      2. Sex Hormones
      3. Growth Factors
   D. Diseases
      1. Viral Causes
         a. Epstein-Barr virus
         b. Kaposi’s sarcoma-associated herpesvirus/human herpesvirus 8
         c. Human papillomavirus
         d. Human T-lymphocyte virus-1
      2. Bacterial Causes
3. Autoimmune Diseases
4. Other Disease States Associated with Cancer

E. Environmental Exposure
1. Tobacco and Smoking
2. Alcohol
3. Pollution
4. Other Environmental Cancer-Causing Agents
   a. Asbestos
   b. Radon
   c. UV radiation

III. THE PREVENTION, DETECTION, AND PROGRESSION OF CANCER 25%
A. Early Detection and Prevention
1. Screening Tests
   a. Fecal occult blood, colonoscopy, and other colon cancer screening methods
   b. Breast exams and mammograms to screen for breast cancer
   c. Pap smear, HPV testing, HPV vaccination, and CA-125 to detect reproductive cancers

B. Diagnosis
1. Symptoms
2. Biopsy
   a. Grading
   b. Staging

IV. TYPES AND TREATMENT OF CANCER 25%
A. Types of Cancer
1. Carcinomas
2. Adenocarcinomas
3. Melanomas
4. Sarcomas
   a. Osteosarcomas
5. Lymphoma
6. Leukemia
7. Myeloma
8. Blastoma
B. Treatments for Cancer
1. Chemotherapy
   a. What is chemotherapy?
   b. Administration of chemotherapy
   c. Side effects of treatment
   d. Examples of chemotherapeutic agents
2. Radiation Treatment
3. Surgery
4. Combining Chemotherapy, Radiation Therapy, and Surgery
   a. Surgery and chemotherapy
   b. Surgery and radiation
c. Chemotherapy and radiation

5. Immunotherapy
   a. Immune checkpoint inhibitors
   b. Adoptive cell transfer
   c. Other types of immunotherapy