

**Weill Cornell Medical College**  
**Physician Assistant Program**  
*A Surgical Focus*

**ANATOMY**

**COURSE DESCRIPTION**

The course in anatomy is a central focus of basic science education. During this course the student is introduced to gross anatomy presented by the regional approach. The student becomes familiar with the back, chest, upper extremity, abdomen, pelvis, lower extremity, neck, head, and the central nervous system. Whenever appropriate, clinical (especially surgical) references are made both from a diagnostic as well as operative point of view. Instruction is primarily in lecture and lab format. However, atlases, computer programs, and other visual aids are available. Student performance is evaluated in both written and practical examinations.

Material is covered in three general groups:

- i) Back, pectoral, upper limb, thorax.
- ii) Abdomen, pelvis, perineum and lower extremity.
- iii) Head and neck.

**A. GOALS**

1. To familiarize the student with anatomic nomenclature and structure.
2. To develop a vocabulary and base of information allowing them to discuss medical issues with colleagues.
3. To relate anatomic structure and function to common clinical situations.

**B. OBJECTIVES**

After completion of this course, the student should be able to:

- Define dorsal, ventral and transverse planes.
- Define medial, lateral, central and peripheral.
- Demonstrate the anatomical position.
- Explain abduction and adduction.
- Describe the function of tendons and ligaments.
- Describe the Structure of a bursae and name sites of clinical significance.
- Describe long bones, short bones, and flat bones and give two examples for each.
- List functions of skin.
- Describe the innervation of cardiac muscle, smooth muscle and striated muscle.
- List the main developmental components of the central nervous system and state the derivatives of each
- Name congenital abnormalities associated with the nervous system.
- Describe dermatomes.
- List three sites for clinically significant lymphatic findings.
- Name two disease states which cause abnormalities of lymph nodes.
- Identify the major bones and muscles on a living subject.
- Describe the attachment of muscles of the upper and lower limbs with the trunk and pelvis; and explain the actions of these muscles.
- Identify the flexor and extensor compartments of the forearm and give an example of a clinical disorder affecting this area.
- Describe the radial, median and ulnar nerve distribution and describe how to test

clinically for these.

- Describe the arterial and venous supply of the upper extremities.
- State the function of the fascial compartment of the hand in infection.
- Identify the parts of a vertebrae on a diagram or model.
- Identify the cervical vertebrae on a living subject.
- Describe the ligamentous attachment of the vertebral column.
- Describe the intervertebral discs and describe their function.
- Give two examples of clinical disorders of discs.
- Describe movement of the vertebral column.
- Describe the relationship of the spinal cord with the vertebral column.
- Describe spina bifida.
- Describe the structure of the types of breast tissue and the basic structure of the breast.
- Describe the blood supply and lymphatic drainage of the breast.
- Identify the sternum and ribs on a living subject.
- Describe the contents of the intercostal area.
- Describe the relationship of the visceral pleura with the parietal pleura.
- Give one example of a clinical problem involving the pleura.
- Describe the structure of the right and left lungs.
- Explain the role of the bronchioles in asthma.
- Explain the main difference between the right and left bronchus and state the clinical significance of this.
- Describe the boundaries of the mediastinum.
- List five structures contained within the mediastinum.
- Explain the function of each chamber of the heart.
- Name the four heart valves and describe a murmur associated with each.
- List the coronary arteries and main branches.
- Describe a normal impulse along the cardiac conducting system.
- Describe the ascending aorta and its branches.
- Give a clinical example associated with the phrenic nerve.
- Give two clinical examples associated with the vagus nerve
- Identify the parts of the skull and mandible on a diagram or model.
- List the layers of the scalp Identify major arteries and veins of the head and neck from a diagram or model.
- Describe the innervation of the facial muscles and give one example of a clinical condition involving this process.
- Identify the temporomandibular joint on a living subject
- Identify the salivary and parotid glands on a living subject.
- Identify the superficial head and neck veins from a diagram.
- Name the two most prominent muscles of the neck and describe the action of each.
- Locate the thyroid gland on a living subject.
- Identify the parathyroid glands on a model or diagram.
- Describe the anatomical relationship of the internal and external carotid arteries and the jugular vein.
- Name the twelve cranial nerves and the function of each.
- List functions of the nose.
- Describe the location of the eustachian tubes.
- Identify the tonsils on a living subject.
- Locate the epiglottis on a model or diagram.
- Locate the thyroid cartilage on a model or diagram.
- List two functions of the muscles of the larynx.
- List sites of clinically significant lymph nodes in the head and neck.

- List major components of the external, middle and inner ear.
- Describe the borders of the orbit.
- List the major muscles of the eye and describe the effect on movement.
- Identify the pelvic bones and attachments on a diagram or model.
- Identify the major bones in the leg.
- Identify the major muscles in the lower extremities and describe the action of each.
- Identify the major components of the femoral triangle.
- Describe the path of the sciatic nerve.
- List the three bones in the region of the knee.
- List ligaments-in the knee and explain the function of each.
- Explain the function of the meniscus and give an example of a common clinical problem.
- Identify the major bones of the foot on a model or diagram.

### **LECTURE/DISSECTION TOPICS**

- Introduction; Course Structure and Organization; Anatomical Terminology
- The Back
- Laminectomy
- Pectoral Region
- The Axilla
- Flexor region of the Arm/Cubital Fossa
- Flexor region of the Forearm
- Palm of the Hand
- Shoulder joint; elbow joint and wrist joint.
- Thoracic Wall
- Thoracic Cavity
- Back/Upper Limb
- Thoracic Cavity
- Heart
- Trachea/Lungs
- Posterior Mediastinum
- Abdominal Wall
- Inguinal Region
- Inguinal Canal
- Penis/Scrotum/Testes
- Abdominal Cavity
- Celiac Artery/Stomach
- Spleen; Liver; Gall Bladder
- Small/Large Intestine; Duodenum; Pancreas
- Suprarenals; Kidneys; Abdominal Aorta; Diaphragm; Posterior Abdominal Wall
- Pelvis
- Perineum; Anal Triangle
- U-G Triangle (male); U-G Triangle (female)
- Hemisect Pelvis
- Anterior Thigh
- Adductor Region of Thigh and Gluteal region
- Popliteal Fossa and Posterior Crural Region
- Lateral Crural, Anterior Crural, and Dorsum of Foot
- Sole of foot

- Joints of lower extremity
- Posterior Triangle of the Neck
- Anterior Triangle of the Neck
- Structures under the sternocleidomastoid
- Root of the Neck
- Face; Temporal and Infratemporal Fossa
- Cranial Cavity; Cranial Nerves
- Orbit
- Prevertebral Region
- Pharynx
- Larynx
- Nasal Cavity and Pterygopalatine Fossa
- Oral Cavity; Submandibular Region

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**BIOCHEMISTRY**

**Course Description:**

Medical Biochemistry emphasizes the biomedical principles of carbohydrate, protein, and lipid chemistry fundamental to clinical medicine. Basic biochemical information is presented and integrated with selected nutritional and health problems by means of lectures and clinical discussions. Specific topics include vitamins, minerals, the chemistry of respiration, pH balance, blood coagulation, and hormonal effects on the metabolism of proteins, carbohydrates and lipids.

Clinical Biochemistry correlates concepts of medical biochemistry with clinical problems such as maintenance of good health, aging, wound healing and growth. Specific topics include hormonal dysfunction, pancreatic/gastric function, iron/heme metabolism, and mineral/water balance.

**Course Goals:**

The goal of this course is to provide students with an understanding of basic chemical and physiologic processes relating to clinical medicine. Students will develop an appreciation for both normal processes and common disease states. Students will become familiar with common physical findings and pertinent lab data.

*Medical Biochemistry*

- Introduction to Biochemistry:
  - Major building blocks in biochemical processes (proteins, lipids, nucleic acids, carbohydrates)
  - Major organelles in the cell
  - Transportation of macromolecules in the cell
  - PH and acid/base homeostasis
  - How viruses, in general, alter cellular physiology
  
- Minerals and Vitamins
  - Micro and macrovitamins
  - Coenzymes
  - Concepts of anabolism, catabolism and transport of molecules
  - Calories
  
- Protein Structure and Enzyme Catalysis
  - Bonding
  - Globulin and albumin
  - Amino acids
    - Wound healing and tissue repair
  - Enzyme kinetics and inhibitors

- Hemoglobin and Myoglobin
  - Oxygen binding
  - Alterations in hemoglobin
  - Hemoglobin, myoglobin and their oxygen saturation curves
  - Metabolic acidosis/alkalosis; respiratory acidosis/ alkalosis
  
- Amino Acid, Muscle Biology and Amino Acid Metabolism
  - Muscle proteins
  - Contraction and relaxation
  - Amino acid metabolism
  - Digestion of protein
  - HCl secretion in the stomach
  - Urea cycle
  - Concept of nitrogen balance
  - Inherited diseases of amino acid disorders
  
- Blood Clotting
  - Extrinsic and intrinsic pathways for blood clotting
  - Agents that inhibit clotting
  - Dissolution of clots
  - Diseases affecting clotting
  
- Carbohydrate Metabolism
  - Digestion of carbohydrates
  - Rate controlling reactions of glycolysis
  - Energy yield of carbohydrate oxidation
  - Reactions of gluconeogenesis
  - Lactase deficiency
  
- Energy Metabolism
  - Krebs cycle
  - ATP production
  
- Lipid Biochemistry and Membranes
  - Lipid digestion
  - Lipid biosynthesis
  - Calculate energy yield and homeostasis
  - Cholesterol metabolism and homeostasis
  - Relationship between cholesterol and atherosclerosis
  - Bile salts
  
- Steroid and Protein Hormones
  - Anterior pituitary hormones
  - Thyroid hormones
  - Parathyroid hormones
  - Calcitonin
  - Insulin
  - Glucagon
  - Catecholamines
  - Gastrointestinal hormones

**Clinical Biochemistry**

- Water, Mineral and Iron metabolism
- Hydration-Dehydration and Diuretic Therapy
  - Glomerular function tests
  - Water balance; rennin-angiotensin system
  - Role of electrolytes in water balance
  - Renal failure and therapies to reverse or prevent it
  - Formation of renal calculi
  - Hydration and dehydration
  - Calcium phosphates and magnesium metabolism
- Blood Gasses-Respiration
  - Bohr effect
  - Chloride shift
  - Pathological states of respiration
  - Alkali (bicarbonates) reserve
  - Blood gas levels as they relate to emergency patient care
- Plasma Proteins, Enzymes in Diagnosis of Disease; Purine/urate metabolism-gout; Inborn errors of Metabolism
  - Altered protein levels determined by electrophoreses
  - Immunoglobulin levels related to liver and autoimmune diseases
  - Proteins in the urine as an index of disease
  - Enzymes in the diagnosis of organ disease
  - Inborn errors of metabolism
- Carbohydrates and Diabetes
  - Glucose tolerance test
  - Ketosis and lactic acidosis
  - Hormones in the control of glucose homeostasis
  - Hypoglycemia and diabetes
- Lipids/Lipoproteins: Hyperlipidemia and Atherosclerosis
  - Classification of lipids and lipoproteins
  - Metabolism of lipoproteins
  - Dietary lipids
  - Disorders of lipid metabolism
  - Hypercholesterolemia and hypertriglyceridemia
  - Heart and Vascular disease
- Pancreatic/Gastric Function-Liver Disease-Malabsorption
  - Lipid absorption
  - Gastric function tests
  - Bilirubin metabolism and jaundice
  - Cholestasis and hepatitis
  - Bile acids and salts
  - Gall stone formation
- Hormonal Control of Metabolism
  - Feedback inhibition
  - Endocrine/exocrine gland function
  - Test to assess altered gland function
  - Oral contraceptives

- Porphyrial, CSF, Biochemical Effects of Tumor
  - Hemoglobinopathies and thalassemia
  - Porphyrrias; methods used to monitor
  - Clinical chemistry tests associated with tumors
  - Diagnosis of meningitis using CSF

### **Course Objectives:**

After completion of this course the student should be able to:

- Define the concept of pH and buffers
- Outline the major organelles in the cell
- Describe transport of macromolecules in the cell
- List the dietary sources of vitamins and minerals
- Identify the effects of excesses and deficiencies of nutrients
- Define specific dynamic action, basal metabolic rates, biological value, and respiratory quotient
- Calculate the number of calories in a diet from a known number of grams of fat, carbohydrate and protein
- Explain the primary structure of proteins
- Describe the bonding that occurs in the  $\alpha$ -helix and  $\beta$ -helix
- List major characteristics of globulin and albumin
- Describe the normal processes of wound healing and tissue repair
- Define enzyme kinetics
- Describe the structure of hemoglobin and myoglobin and their oxygen saturation curves
- List allosteric effectors of oxygen binding
- Define Heinz body, Bohr effect, and chloride shift
- Describe the alterations in hemoglobin that occur in sickle cell anemia, diabetes mellitus, and exposure to carbon monoxide and cyanide
- Describe pathologic states of respiration (metabolic acidosis/alkalosis; respiratory acidosis/alkalosis)
- Outline the steps in the digestion of protein
- Identify the enzymes involved in protein digestion
- Describe the process of HCl secretion in the stomach
- Describe the removal of nitrogen
- List the reactions producing ammonia
- Describe how ammonia is transported from the tissues to the liver
- Explain the concept of nitrogen balance
- Outline the extrinsic and intrinsic pathways for blood clotting
- List the conditions and agents that inhibit clotting both in drawn blood and in the circulation
- Describe how clots are dissolved
- Relate the inherited diseases that affect clotting to the site of the defect
- Describe the digestion of carbohydrates and glucose oxidation
- List the rate-controlling reactions of glycolysis and what factors control them
- Calculate the energy yield of carbohydrate oxidation
- Outline the reactions of gluconeogenesis; note the difference from glycolysis
- Explain lactase deficiency
- List the reactions leading from glucose to glycogen and those necessary for glycogen breakdown
- Match enzyme defects with glycogen storage disease

- Describe the regulation and energetics of the Krebs cycle
- Describe the Mitchell hypothesis for ATP production
- List the sources of ATP produced by the complete oxidation of glucose
- Outline lipid digestion
- Outline lipid biosynthesis
- List the contents of the circulating lipoprotein particles
- Calculate the energy yield from the complete oxidation of a fatty acid
- Name the ketone bodies and outline their production
- Describe the relationship between cholesterol and atherosclerosis
- Explain the role of bile salts and describe their function
- Describe the biological activities of the prostaglandins and leukotrienes
- Describe the effects of aspirin and indomethacin on blood coagulation
- List the function of membranes
- Describe the general mechanism by which influence the metabolic activity of their target cells
- List the biochemical effects of the parathyroid hormone, calcitonin, insulin, glucagons, the catecholamines, and the gastrointestinal hormones
- Describe the results of deficiency or excess to these hormones
- Describe the role of electrolytes in water balance
- Describe mineral balance as it relates to diuretic therapy
- Define renal failure and give an example of prevention and treatment
- List four objective findings in dehydration
- State two factors contributing to kidney stone formation
- List four pathological states of respiration as determined by arterial blood gas values
- Describe how disorders of purine/urate can lead to gout
- Give three examples of disease caused by inborn errors of metabolism
- List three clinical tests used to detect diabetes mellitus
- Explain the significance of ketoacidosis
- Describe the role of hormones in carbohydrate metabolism
- Describe the metabolism of dietary lipids
- Explain the relationship of hyperlipidemia and atherosclerosis
- Describe the clinical significance of hypercholesterolemia in cardiovascular disease
- Describe malabsorption syndromes in intestinal and pancreatic disease
- Give one example of altered gastric function and a clinical test used to make the diagnosis
- Define cholestasis and give an example of a problem which develops from this
- Describe gall stone formation
- State the relationship between bilirubin metabolism and jaundice
- Explain how hormones work in general terms
- Explain the difference between endocrine and exocrine gland function
- List the standard tests used to assess altered glandular function
- Describe the role of the thyroid in regulating basal metabolic rate
- Describe the defect in sickle cell disease and thalassemia
- Give an example each of an endocrine, adrenal and nervous system tumor and describe the clinical method used in detection of these tumors.
- Describe the changes in the lab values of CSF in meningitis and describe the significance of these.

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**MEDICAL INTERVIEWING**

**Course Description:**

This 9-week course will introduce the student to the skills necessary for successful medical interviewing. Course materials and readings will explore the relationship between normal conversation and medical interviewing. The student will learn and practice various techniques for eliciting an accurate medical history from a variety of patient types. Each section of the medical interview will be studied and practiced in detail in preparation for the patient encounters scheduled for early in this semester.

The course is divided into four sections:

1. Introduction to the Medical Interview and Patient History
2. The Review of Systems
3. Clinical Thinking
4. Special Issues in Interviewing

**1. Introduction to the Medical Interview and Patient History**

A. Goals:

1. To introduce the student to the role of the Physician Assistant in physical assessment;
2. To introduce the components of a patient history;
3. To introduce interviewing techniques
4. To introduce the format of the history
5. To introduce documentation skills.
6. To gain a knowledge of medical terminology.

Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Describe the components of and give an example of demographic data, the chief complaint, history of present illness, past medical history, family history, review of systems;
2. Describe several approaches/techniques to obtain detailed medical information;
3. Describe in detail the steps required to interview a patient in the correct sequence;
4. Formulate a chief complaint in a brief and concise manner;
5. Identify in a sample history any material lacking or insufficient from the document.
6. Interview and obtain a complete medical history from an actual or simulated patient.
7. Prepare a written report of a complete medical history in the proper format.
8. Utilize medical terminology as appropriate to the professional setting.

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**MEDICAL INTERVIEWING**

**2. The Review of Systems:**

A. Goals:

1. To introduce the general approach to a symptom or complaint;
2. To describe the review of the systems role in the complete health assessment;
3. To discuss how the review of systems prevents losing crucial information in a complete medical history.

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Differentiate between a sign and a symptom.
2. List the common symptoms associated with a given body systems;
3. Describe in non-medical terminology, the components (system by system) of a review of systems;
4. Be able to interview a subject to elicit a thorough review of systems from an actual or mock patient;
5. Prepare a written report of a complete review of systems in the proper format

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**MEDICAL INTERVIEWING**

**3. Clinical Thinking**

A. Goals:

1. To develop cognitive skills required in the practice of medicine.
2. To become familiar with the steps in clinical decision-making.
3. To gain experience in making sound differential diagnoses.

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Compare “subjective” and “objective” data;
2. Name potential sources of data considering different patient evaluation settings;
3. Explain the concept of “ruling out” a disease;
4. List all positive and negative data from a patient’s medical record that are pertinent to diagnosis;
5. Explain hypothesis generation and reasoning methods;
6. Develop and document a comprehensive problem list for a patient;
7. Formulate a differential diagnosis and revise the diagnosis based upon new clinical findings as they are presented

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**MEDICAL INTERVIEWING**

**4. Special Issues in Interviewing**

A. Goals:

To expand history-taking techniques to include a variety of special patient populations and/or situations.

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Identify several reasons a patient may be reticent and describe techniques for improved communication with these patients
2. Identify several reasons a patient may be over-talkative and describe techniques for improved communication with these patients
3. Describe effective and efficient methods of delivering bad news to a patient
4. Identify nonverbal communication signals characteristic of a patient's mood
5. Identify non-verbal communication techniques an interviewer may utilize to enhance communication with patients
6. Explain several ways in which communication with a pediatric patient differs from an adult or elderly patient
7. Describe techniques that may be utilized to facilitate communication with pediatric patients.
8. Understand the role parents and caregivers play in the pediatric medical interview
9. Be familiar with special techniques required for the geriatric patient and methods for integrating social, economic and cultural factors into the interview
10. Understand how effective communication will improve the satisfaction of the patient and PA in their encounters

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**PHYSICIAN ASSISTANT SEMINAR**

**Course Description:**

This course prepares the student to understand the role of the physician assistant in the 21<sup>st</sup> century healthcare in the United States, as well as the development and organization of the physician assistant profession. Topics are addressed such as professionalism, legal aspects of health care, use of medical literature, familial and cultural components of health care, medical ethics, health promotion/disease prevention, and patient education. The impact of managed care, malpractice reforms the political & legislative process, and PA practice issues are all discussed.

Students explore the dynamics of PA practice, including such issues as responsibilities to patients and the public, professional regulation and involvement, team care, cultural diversity, and developing trends in PA practice. Students are encouraged to explore, critique, and evaluate professional practice issues especially as they relate to the quality, delivery and cost-effectiveness of our nation's health care system.

Students will explore history of midlevel providers in general and, specifically, the relationship of the PA to the patient and to other practitioners. Students will incorporate sound legal and ethical principles, cross-cultural sensitivity, health promotion and disease prevention into their practice. You will gain knowledge and facility in patient education with an emphasis on enhancing treatment compliance, obtaining informed consent and a collegial approach to the patient-provider relationships.

This course is divided into twelve units:

1. Introduction to the study of Medicine and Surgery/orientation to Pre-Clinical Study
2. The PA Profession and PA Professionalism
3. Health Care in the 21<sup>st</sup> Century
4. Medicine in Media
5. Health and Illness
6. Cross-cultural Competency
7. Health Promotion/Disease Prevention
8. Human Sexuality
9. Medical Ethics
10. Quality Assurance
11. Patient Education

**Course Goals:**

To prepare students to understand the role of the Physician Assistant in the health care system, and to more easily assume the PA student role, and eventually the role of a graduate PA upon graduation. Through assigned readings, small group projects and in-class discussion, PA

Seminar addresses the history of the profession, the relationship of the PA to the patient and to other practitioners, the value of cultural diversity in health and illness, concepts of medical ethics, health promotion, disease prevention, and patient education.

**Course Objectives:** At the completion of the PA Seminar Course, the student should be able to:

- \* describe the major events in the founding and development of the PA profession
- \* discuss current national statistics describing PA education and practice
- \* contrast views of health, illness and healing in various cultures
- \* describe health care delivery in the US, including access to care, insurance and reimbursement issues, and current issues in health care policy
- \* use basic concepts of medical ethics in decision-making models
- \* describe the advantages of maintaining health over treatment of disease
- \* identify major screening tests and the intervals at which they are performed in common practice
- \* list clinically important modifiable high health risk behaviors
- \* use behavior modification techniques in enhancing the health status of patients
- \* identify the most clinically relevant aspects of a selected topic in health promotion and disease prevention
- \* describe the practical ways in which health care providers can improve the health of individual patients or patient populations with regard to a selected topic
- \* discuss the most effective means of educating patients about selected health promotion topics
- \* Work in small groups in the design and delivery of presentations for colleagues.
- \* Understand ethical principles and theories that govern the clinician-patient relationship and medical decision making, particularly with regard to beginning and end of life issues, genetics and molecular technologies;
- \*Discuss the organization, financing, and delivery of health care services in America today.

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**PHYSICIAN ASSISTANT SEMINAR**

**1. Introduction to the Study of Medicine and Surgery/Orientation to Pre-Clinical Study**

A. Goal:

1. To assume the role of student within the disciplines of medicine and surgery.
2. To apply successful academic strategies to physician assistant studies.
3. To identify program faculty as mentors and models for academic achievement.

B Objectives: After completion of this unit, the student will be able to:

1. Identify personal strengths and weaknesses in past academic pursuits.
2. List various strategies for increased academic achievement in physician assistant education.
3. Participate in lectures and seminars as an active learner.
4. Discuss the following techniques as they pertain to the study of medicine and surgery:

Time management skills  
Reading comprehension  
Stress reduction  
Small group study  
Note taking skills  
Test taking skills

5. Understand the design and organization of the PA Program, as well as its history.

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**PHYSICIAN ASSISTANT SEMINAR**

**2. The PA Profession & PA Professionalism**

A. Goals:

1. To envision the role of a physician assistant as it will be assumed after graduation.
2. To assimilate into the organizational culture of the physician assistant profession.
3. To foster involvement in professional activities and associations for the physician assistant.
4. To review the history and growth of the PA Profession, as well as the Cornell PA Program.

B Objectives: After completion of this unit, the student will be able to:

1. Provide a working definition of the following:

profession  
professionalism

2. List the various professional organizations for physician assistants and describe the activities of each, including:

NYSSPA  
SAAAPA  
APAP  
AASPA  
NCCPA  
ARC-PA

3. Identify the characteristics of an active PA student society and list the avenues for student involvement within PA professional organizations.

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**PHYSICIAN ASSISTANT SEMINAR**

**3. Health Care in the 21<sup>st</sup> Century**

A. Goals:

1. To appreciate the history of the development of health care systems in the United States.
2. To accurately place the physician assistant within a comprehensive team approach to health care.
3. To critically analyze the status quo of health care delivery systems and make strategic plans for future improvement.
4. To foster a role as patient advocate within a climate of managed care.

B Objectives: After completion of this unit, the student will be able to:

1. Describe the historical development of the physician assistant profession.
2. Compare and contrast the following:  
  
Fee-for-service plans  
Preferred Provider organizations  
Health Maintenance Organizations  
Managed Care
3. To identify existing inequity in the distribution of health care resources and investigate their root causes.
4. To delineate the process of health care legislation and the various points of access to the lawmaking process.

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**PHYSICIAN ASSISTANT SEMINAR**

**4. Medicine in Media**

A. Goals:

1. To explore the images of clinician and healer in television, film and other art forms.
2. To discover positive role models in media portrayals of medical professionals.
3. To understand the impact of the media in the general public's view of medical professionals.

B Objectives: After completion of this unit, the student will be able to:

1. Critically analyze the portrayal of medical personnel in television and film.
2. Describe positive and negative professional characteristics included in media characterizations of healthcare providers.
3. Synthesize positive traits of the caregiver character into a student's own professional aspirations.

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**PHYSICIAN ASSISTANT SEMINAR**

**5. Health and Illness**

A. Goals:

1. To develop an understanding of health and illness as defined by various U.S. subcultures.
2. To understand patient centered medicine and its value in developing a productive patient-provider relationship.
3. To foster an interest in health maintenance and the continued well-being of patients

B Objectives: After completion of this unit, the student will be able to:

1. Provide a holistic and comprehensive definition of health and illness
2. Recognize the various roles patients assume during illness and recovery and provide appropriate interventions at each stage.
3. To discuss the advantages of maintaining health compared to treatment of illness and disease.
4. Discuss the role that Complimentary and Alternative medicine has had on the delivery of healthcare, the role of the PA, and on health and illness.

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**PHYSICIAN ASSISTANT SEMINAR**

**6. Cross-cultural Competency**

A. Goals:

1. To gain exposure to health traditions and beliefs of various US subcultures.
2. To appreciate diversity in populations of both patients and providers.
3. To develop strategies and skills in providing health care to communities with varied racial and ethnic groups.

B Objectives: After completion of this unit, the student will be able to:

1. Use the medical literature in researching health traditions and beliefs of a US subculture.
2. Work as a member of a team in presenting research findings to peers.
3. List health care practices and beliefs of the following subcultures in the US:

African American communities  
Asian and Pacific Islander communities  
Latino communities  
Native American communities  
European American communities

4. Incorporate cross-cultural sensitivity into the student's future practice of medicine.

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**PHYSICIAN ASSISTANT SEMINAR**

**7. Health Promotion/ Disease Prevention**

A. Goals:

1. To gain an appreciation for the advantages of keeping patients well as compared to treating ill patients.
2. To differentiate between modifiable and non-modifiable risk factors and seek to have a positive impact on the modifiable risk factors of patients.
3. To investigate the current best preventive practices in the most common disease states in the US.

B Objectives: After completion of this unit, the student will be able to:

1. Differentiate among the concepts of primary prevention, secondary prevention and tertiary prevention
2. Discuss current theories of behavior change, especially in the context of the patient-provider interaction
3. Perform a risk assessment and provide a patient with appropriate risk reduction strategies.
4. Define the characteristics of a quality screening test including sensitivity, specificity, positive predictive value, and negative predictive value.
5. Incorporate preventive medicine into the management of the following diseases:

Heart disease  
Cancer  
Cerebrovascular disease  
COPD  
Unintentional injuries  
Infectious diseases  
Diabetes

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**PHYSICIAN ASSISTANT SEMINAR**

**8. Human Sexuality**

A. Goals:

1. To prepare to take a detailed confidential sexual history from a patient.
2. To recognize the variations of human sexual activity and to provide non-judgmental, compassionate care to patients with concerns regarding sexuality and sexual function.
3. To understand the instances in which sexual activity can adversely affect the health of patients and to help patients modify risky behaviors.

B Objectives: After completion of this unit, the student will be able to:

1. Define and discuss the following with regard to a provider's interactions with patients:
  - Transference
  - Countertransference
  - Sexual harassment
  - Professional distance
  - Boundary issues
2. List sexual practices commonly described in patient histories and recognize those behaviors that are health risks
3. Provide supportive and non-judgmental care and education to patients with issues concerning sexual health and sexuality.
4. Utilize the P-LI-SS-IT outline in discussing sexual concerns of patients:
  - Permission
  - Limited Information
  - Specific Suggestions
  - Intensive Therapy

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**PHYSICIAN ASSISTANT SEMINAR**

**9. Medical Ethics (6 hours)**

A. Goals:

1. To recognize ethical dilemmas in the practice of medicine and to evaluate both sides of a controversial issue.
2. To recognize one's own biases and convictions and realize the occasions where these may interfere with patient-centered health care.
3. To develop a process for medical decision making and to explore resources available to practitioners to aid in making ethical decisions.
4. Understand the day to day impact of Bioethics on the treatment of patients across the lifespan.

B Objectives: After completion of this unit, the student will be able to:

1. Discuss the dilemma of knowledge and the limitation of medical practice by laws, by regulations, by professional standards, and by ethics.
2. Summarize the following historical documents and their impact on present-day medical ethics

Nuremberg Code of Ethics in Medical Research  
Declaration of Helsinki

3. Differentiate between paternalistic and collegial medical practice & the medical marketplace.
4. Define the following terms and use them in ethical decision-making:

Consequentialism  
Deontology  
Autonomy  
Beneficence  
Nonmaleficence  
Justice

5. Describe the necessary components of informed consent. Define capacity.
6. Describe the role of Bioethics in reproductive/genetic medicine
7. Identify how the Social Work profession can assist in the management of patients.

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**PHYSICIAN ASSISTANT SEMINAR**

**9A. Ethics: Decisions at the End of Life**

A. Goals:

1. To apply sound principles of medical ethics in all end-of-life issues.
2. To incorporate current best practices in the care of the terminally ill patient.
3. To care for the dying patient with compassion, support, and respect for personhood.

B Objectives: After completion of this unit, the student will be able to:

1. Provide a cultural framework for the appropriate care of the dying patient and their families.
2. Discuss the five stages of dying and the unique needs of patients at each stage.

Denial  
Anger  
Bargaining  
Depression  
Acceptance

3. Define the following and incorporate them into the comprehensive care of the terminally ill patient.

Respite Care  
Hospice Care  
Advance Directives  
Living Will  
Health Care Proxy

4. Discuss the possibility of organ donation where appropriate.
5. Provide an informed position concerning various end-of-life ethical dilemmas using position papers of the AAPA and other professional organizations

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**PHYSICIAN ASSISTANT SEMINAR**

**10. Quality Assurance**

A. Goals:

1. To improve the efficiency, effectiveness and quality of health care delivered by physician assistants to their patients and
2. To help improve overall clinical outcomes at local, state, national, and global levels.
3. To gain familiarity with education and credentialing requirements of physician assistants and other providers.
4. To interact with governmental and regulatory agencies as an advocate for the patient and the profession.

B Objectives: After completion of this unit, the student will be able to:

1. List various credentialing and accrediting organizations associated with physician assistant practice and describe their function, including:

NYS Education Department Office of the Professions  
NCCPA  
ARC-PA  
ACCME  
JCAHO  
AAAHHC  
CMS (HCFA)

2. Discuss the following concepts related to health care quality assurance:

Patient Safety  
Clinical Resource Management/ Utilization Review  
Credentialing and Privileging of Healthcare Professionals  
Risk Management  
Regulatory Environment  
Quality Improvement Process/Plan  
Best Practices  
Performance Measures and Improvement

3. Describe the licensing, credentialing and continuing medical education process of a practicing physician assistant and identify significant differences between this process and that of other health related professions.
4. Describe and define the role of Quality assurance/quality management on the practice of medicine and the delivery of healthcare in both the inpatient and outpatient settings.

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**PHYSICIAN ASSISTANT SEMINAR**

**12. Patient Education**

A. Goals:

1. To explore successful techniques in conveying important health maintenance information to patients.
2. To develop strong communication skills in speaking with patients
3. To gain experience working in small groups, researching health issues, and making formal presentations to peers.

B Objectives: After completion of this unit, the student will be able to:

1. Discuss the following health care issues including the relevant points for patient education:
  - Smoking Cessation
  - Alcohol and Substance Abuse
  - Domestic Violence
  - Stress Reduction
2. Work with colleagues to select and research a current patient education topic and provide a formal presentation of the research findings to peers.
3. Develop skills to anticipate the education needs of patients, discover evidence-based answers to patients' questions and concerns, and communicate instructions and other aspects of patient education in effective ways.

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**Physical Diagnosis I**

**Course Description:**

This course will provide the students with instruction in performing the physical examination. These skills are necessary for evaluation and diagnosis of patients in the clinical setting, and continues to reinforce interviewing skills presented and practiced in the Medical Interviewing course.

The student will learn and practice various examination techniques for eliciting objective data from a variety of patient types. Each section of the physical examination skills covered in this semester will be studied and practiced in the detail in preparation for the patient encounters scheduled this semester and clinical rotations and PA practice.

This course is divided into 7 units:

1. Introduction to the Physical Examination
2. Physical examination of the Integumentary System
3. Physical examination of the Eye
4. Physical examination of Nose and Sinus
5. Physical examination of the mouth and oropharynx
6. Physical examination of the Ears
7. Physical examination of the Neck and Thyroid

**1. Introduction to the Physical Examination:**

A. Goals:

1. To introduce the general approach / overview of the physical examination;
2. To review the components of the examination;
3. To introduce general rules and techniques for performing a physical examination.

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learning, the physician assistant student should be able to:

1. Describe the role of the physical examination in health assessment;
2. Discuss the components of a complete physical examination;
3. Define a focused physical examination;

4. Describe the clinical setting in which a focused physical examination is performed in lieu of a complete examination
5. List and define the four techniques employed in the course of physical examination;
6. Discuss the importance of performing these steps in different sequence for different areas of the physical examination.

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**Physical Diagnosis I**

**2. The physical examination of the Integumentary System:**

A. Goals:

1. To review the anatomy and physiology of the skin, hair, and nails;
2. To review the pertinent historical workup of the skin, hair, and nails;
3. To discuss the techniques of the dermatologic examination;
4. To discuss the written examination report of the dermatologic examination.
5. To review common integumentary complaints

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant should be able to:

1. Describe the anatomy of the skin, hair, and nails;
2. List questions employed to investigate both specific and general integumentary complaints;
3. Describe the inspection and palpation of the skin, hair, and nails;
4. Perform a complete examination of the integumentary system in an actual and mock patient;
5. Describe the most common presentation of skin lesions. Identify and classify lesions upon physical inspection.
6. Define the classic criteria of malignant skin lesions.

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**Physical Diagnosis I**

**3. The physical examination of the Eye:**

A. Goals:

1. To review the anatomy of the eye;
2. To review the ophthalmologic history and review of systems;
3. To introduce the physical examination of the eye, both as an independent and as a component of the cranial nerve examination
4. To review common ophthalmologic complaints

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Identify the characteristics of normal anatomy of the eye;
2. List the cranial nerves responsible for eye movement;
3. Describe and demonstrate the proper technique in evaluating for pupil reactivity, visual acuity, visual fields, extraocular movements, corneal reflex and funduscopy;
4. Demonstrate the technique used to inspect and palpate the external eye, including eversion of the upper eye lid;
5. Identify the parts of and explain the correct use of an ophthalmoscope;
6. Describe normal findings during funduscopy including but not limited to optic disc, retinal vessels, macula, fovea;
7. Prepare a written report of an ophthalmologic examination using the proper format.

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**Physical Diagnosis I**

**4. The physical examination of Nose and Sinuses:**

A. Goals:

1. To review the anatomy of the nose and sinuses;
2. To review the history and review of systems pertaining to the nose and sinuses;
3. To introduce the physical examination of the nose and sinuses, both as an independent system and as a component of the cranial nerve examination;
4. To review common complaints of the nose and the sinuses.

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Identify the characteristics of normal anatomy of the nose and sinuses;
2. List the five anatomical landmarks of the external nose
3. Properly check for olfactory function ( including patency) and define its role in assessing the cranial nerves;
4. Describe and demonstrate the examination of the nasal cavities;
5. Properly check for sinus tenderness
6. Prepare a written report of a physical examination of the nose and sinus using the proper format

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**Physical Diagnosis I**

**5. The physical examination of the mouth and oropharynx:**

A. Goals:

1. To review the anatomy and pertinent physiology of the mouth and oropharynx;
2. To review the history and review of systems pertaining to the mouth and oropharynx;
3. To introduce the physical examination of the mouth and oropharynx, both as an independent system and as a component of the cranial nerve examination;
4. To review common oropharyngeal complaints

B. Objectives:

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Identify the characteristics of normal anatomy of the mouth and oropharynx;
2. Define how the cranial nerve examination is incorporated into the oropharyngeal physical examination;
3. List the different types of teeth;
4. Properly examine the lips, gums, teeth, roof and floor of the mouth, tongue, and pharynx;
5. Prepare a written report of an oropharyngeal examination using the proper format

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**Physical Diagnosis I**

**6. The physical examination of the ears;**

A. Goals:

1. To review the anatomy and pertinent physiology of the ears and hearing;
2. To review the history and review of systems pertaining to the ears;
3. To introduce the physical examination of the ears, both as an independent system and as a component of the cranial nerve examination;
4. To review common otic and auditory complaints

B. Objectives:

After attending lecture, completing the reading and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Describe landmarks of the external ear and tympanic membrane;
2. Describe the difference in anatomy between the Eustachian tube of an adult and a child;
3. Identify the most common abnormalities of the auricle;
4. Describe the normal findings of an ear examination;
5. Demonstrate a normal ear examination including gross assessment of auditory acuity, Weber test, and Rinne test;
6. Describe pathways of hearing;
7. Prepare a written report of the examination of the ear and hearing using proper format.

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**Physical Diagnosis I**

**7. The physical examination of the Neck and Thyroid:**

**A. Goals:**

1. To review the anatomy and pertinent physiology of the neck and thyroid;
2. To review the history and review of systems pertaining to the thyroid;
3. To introduce the lymphatic, vascular, respiratory, musculoskeletal, cranial nerve portions of the neck examination;
4. To review common complaints of the neck and lymphatic systems.

**B. Objectives:**

After attending lecture, completing the readings and assignments, and practicing the skills learned, the physician assistant student should be able to:

1. Describe the pertinent landmarks of the neck;
2. Properly inspect the neck;
3. Demonstrate the steps taken to auscultate the thyroid and palpate the thyroid from behind the patient;
4. Demonstrate palpation and auscultation of the carotids
5. Identify the major lymph nodes of the region and properly palpate them in correct sequence;
6. Know the parameters for describing an abnormal lymph node;
7. Prepare a written report of the examination of the neck and thyroid using proper format.

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**SURGICAL ASPECTS OF PRIMARY CARE**

**Course Description:**

This course will introduce the PA student to the basic concepts and procedures commonly encountered while working in surgery. Basic concepts such as phlebotomy, bandaging, dressings, pre-operative care, intravenous therapy and transfusions, IM and SC injections, management of fever, overview of radiology, introduction to the OR environment, and some GI topics will be covered. Although the course is surgically focused, the emphasis on practical skills and bedside procedures is applicable to most patient care settings. This course builds the foundation for PAS 6120 (General Surgery) and PAS 6130 (Surgical Specialties).

There will be ample time to practice clinical skills on lab models and each other. You will each be assigned to a small group with lab time to facilitate learning and technical skills. Alternating with Surgery Lab (usually Thursday mornings), you will practice the medical interview, or accompany a PA or MD a clinical department of the hospital.

This course is divided into eight units:

1. Introduction to bandaging and wound care;  
Introduction to surgical instruments
2. The Surgical PA – The PA's role in the surgical setting
3. The approach to the surgical patient
4. Wounds and wound healing
5. Fluid and Electrolytes
6. Surgical infections
7. Surgical bleeding & blood replacement
8. Intramuscular & subcutaneous injections, intravenous placement, venipuncture.

**A. Goals:**

1. To apply basic principles of surgery in the management of common primary care problems as appropriate.
2. To develop the intellectual skills necessary to foster critical thinking in the use of surgical knowledge and skills in non-surgical practice settings.
3. Through lecture and discussion, students can integrate previous and current learning to foster the understanding the interrelationship of medical and surgical practice.
4. To formulate new and creative understanding within the domain of surgical practice, drawing upon learning acquired through self-initiation from other resources.

**Weill Cornell Medical College**  
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**SURGICAL ASPECTS OF PRIMARY CARE**

**1: Introduction to Bandaging & Wound Care**

- A. Goal: To introduce the new surgical PA student to basic types of dressings & bandages
- B. Objectives: At the end of this unit the student should be able to:
1. Define a dressing. List the ideal qualities of a dressing. Identify the four functions of a dressing.
  2. Define a bandage.
  3. Compare and contrast the different materials used for bandages and dressings.
  4. List the indications for different types of bandages.
  5. After supervised practice, be able to perform an ovoid, recurrent, sling, spiral, wrist, and figure-eight bandage.
  6. List the common types of occlusive dressings.
  7. Describe the immediate steps for the control of hemorrhage.
  8. List and discuss the basic terms used in wound care.
  9. Describe the components of a standard post-operative dressing

**Part II**

**Introduction to Surgical Instruments**

1. List the main categories of surgical instruments by function.
2. Recognize the basic types of surgical scissors, and discuss their uses in the surgical setting.
3. Identify the parts that compose a typical 'ringed' surgical instrument.
4. Be able to properly hold a ringed instrument.
5. Know the difference between clean, aseptic, and sterile instruments. Understand the rationale and methods for decontamination of instruments.

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**SURGICAL ASPECTS OF PRIMARY CARE**

**2: The Surgical PA - The PA's Role in the Surgical Setting**

A. Goals: The student should gain an awareness of

1. The requirements for training & practice in surgery
2. The laws regulating SPAs
3. The SPAs primary job functions
4. The role of professional societies

B. Objectives: At the end of this unit the student should be able to:

1. List the requirements to become a surgical PA
2. Describe the requirements for certification as an SPA, and methods for recertification.
3. List the most common areas of surgical PA practice.
4. Be aware of billing and coding, and describe how SPAs are reimbursed for their service. Understand the role of the CMS and RBRVS.
5. Know the 5 K's of a good surgical PA
6. Describe the reasons for high demands for surgical PAs, and the decline in the number of surgeons.
7. Explain the role of Surgical PA societies, and the role of the ACS (American College of Surgeons).
8. Compare and contrast a PA with a RNFA, CST-FA, RN, AA, & CRNA
9. Explain how PAs may create their own "Surgical Assisting" company, and how this may be profitable.
10. Discuss the role of the "Surgical First Assistant"

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**SURGICAL ASPECTS OF PRIMARY CARE**

**3: Approach to the Surgical Patient**

Purpose: To review history, physical and assessment skills required for surgical practice.

To introduce unique practice areas in surgery

A. Goals: The PA-S will become familiar with:

1. The surgical H & P
2. Pre-op, evaluation & management
3. The operative team

B. Objectives: At the end of this unit the student should be able to:

1. List the components of an emergent surgical history
2. Define and describe ASA classifications
3. Understand operative risk
4. Properly document a pre-op work-up
5. Compare and contrast the different positions patients may be placed in on the operative table. Identify possible safety hazards associated with moving a patient from stretcher or stryker to the OR table. Describe the potential physiologic effects of positioning on a patients body system.
6. Describe, the functions of the members, of the operative team.
7. Describe "surgical stress" and understand how it affects patients' morbidity and mortality.
8. List the main components of OR design. List the 3 key features employed in the design of the modern OR.

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**SURGICAL ASPECTS OF PRIMARY CARE**

**4:           Wounds & Wound Healing (two lectures)**

Purpose:       To integrate basic science knowledge (biochemistry, physiology, & pathology) with new information on the mechanism of tissue repair & wound healing.

A.       Goals:

1.       To discuss the stages of wound healing with emphasis on the biochemical aspects, physiologic aspects.
2.       To educate the student on the classification of primary, secondary, and tertiary healing.
3.       To educate the student on factors affecting wound healing.
4.       To discuss the management of wounds: clean, contaminated, and infected.

B.       Objectives: At the end of this unit the student should be able to:

1.       Define a wound
2.       Discuss the initial response of wound healing.
3.       Describe the essential elements and importance of granulation tissue.
4.       Describe the phases of wound healing distinct to each type of wound.
5.       Describe the 3 types of wound healing & their elements
6.       Describe the clinical factors that decrease collagen synthesis and wound healing.
7.       Compare and contrast various types of sutures: stainless steel, non-absorbable & absorbable, as well as tapes & staples.
8.       Discuss the function of a wound dressing
9.       Define: clean, contaminated, & infected wounds. Provide two examples of each.
10.      Discuss the type of patient that might develop problems with wound healing.

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**SURGICAL ASPECTS OF PRIMARY CARE**

**5: Fluid & Electrolytes (3 lectures)**

**Purpose:** To familiarize the student with the recognition & management of fluid, electrolytes, & related acid base abnormalities with respect to surgical patients. This lecture will integrate knowledge of biochemical & physiological concepts with clinical material

**A. Goals:**

1. To afford the student of an overview of the anatomy & composition of fluid compartments, regulation of sodium, water, osmolarity, potassium metabolism and acid base balance.
2. To educate the student on volume disorders (depletion/excess).
3. To educate the PA-S on disorders of electrolyte concentration including the causes and treatments of the hypo- & hyper- states of electrolyte concentrations & divalents.
4. To educate the student on acid-base balance disorders.
5. To educate the PA-s on fluid & electrolyte treatment; including normal daily balance, preoperative therapy, intraoperativetherapy, and postoperative therapy.

**B. Objectives:** At the end of this unit the student should be able to:

1. Describe the extracellular, intracellular, & intravascular volumes of a 70 kg man.
2. List the major signs. & symptoms of dehydration. Be able to manage dehydration in the hospital setting.
3. Describe the basic renal mechanisms, to control fluids & electrolytes.
4. Describe objective ways of measuring fluid balance.
5. Describe the 24 hour sensible & insensible fluid & electrolyte losses in the routine postoperative patient.

6. List the etiology, lab diagnosis, and treatment of:

hypernatremia  
hyponatremia  
hyperkalemia  
hypokalemia  
hyperchloremia  
hypochloremia  
hypercalcemia  
hypoocalcemia  
hypermagnesemia  
hypomagnesemia  
hyperphosphatemia  
hypophosphatemia

7. Discuss the major IV fluids employed in the surgical setting. Understand the effect each IV Fluid will have on the movement of fluids within the body.
8. Be able to calculate IV Fluids rates for maintenance, NPO, Post-op, Sepsis, electrolyte abnormalities, etc.

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**SURGICAL ASPECTS OF PRIMARY CARE**

**6: Surgical Infections (3 lectures)**

Purpose: To integrate the students knowledge of microbiology, pathology, & pharmacology with infections in the surgical patient.

A. Goals:

1. To educate the student on the pathogenesis of infection.
2. To educate the student on the prevention of surgical infections.
3. To educate the student on the etiology, diagnosis, and management of established infection.

B. Objectives: At the end of this unit the student should be able to:

1. List the factors that contribute to infection in a postoperative patient.
2. List the various types of surgical infections.
3. Describe the basic principals in the prevention of infection.
4. Describe the diagnostic features & treatment for common skin infections.
5. Describe the indications & method for providing routine & reverse isolation.
6. Discuss common hand infections & describe the treatment of each.
7. Know the four most frequently reported pathogens associated with nosocomial surgical wounds as well as their treatment.
8. Describe the mechanisms in the spread of surgical infections.
9. List the causes of postoperative fever & discuss the diagnostic steps in its evaluation.

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**SURGICAL ASPECTS OF PRIMARY CARE**

**7: Surgical Bleeding & Blood Replacement**

Purpose: To integrate the normal physiology of blood clotting, including the extrinsic & extrinsic pathways with the issues of bleeding & blood replacement in the surgical patient

A. Goals: The goals of this lecture is to educate the student on:

1. The hemostatic process
2. Patient evaluation & testing to assess hemostasis
3. The causes of surgical bleeding (preexisting hemostatic defects, acquired bleeding disorders, bleeding in the post operative period, and disseminated intravascular coagulation).
4. Surgical blood replacement
5. The estimation of factor VII transfusion requirements in the surgical patient (including the management of hemophilia, von Willebrands disease, and transfusion safety).

B. Objectives: At the end of this unit the student should be able to:

1. List the minimum preop screening tests necessary for asymptomatic patients..
2. Know the indications for RBC transfusion.
3. Name the common surgical conditions leading to disseminated intravascular coagulation.
4. Outline the management of hemolytic transfusion reactions.
5. Identify primary caused of bleeding in the postoperative period.
6. Discuss the guidelines employed in surgical blood replacement

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**SURGICAL ASPECTS OF PRIMARY CARE**

**8: Intramuscular & Subcutaneous Injections, Intravenous Placement, Venipuncture.**  
(3 Lectures)

A. Goals:

1. To introduce the PA student to parenteral medication delivery & venous access.
2. To introduce the PA-S to phlebotomy
3. To develop the clinical skills of IM, SC, IV, & Phlebotomy.

B. Objectives: At the end of this unit the student should be able to:

1. List all the required equipment for IM & SC injections, venous access (IV placement) and venipuncture (phlebotomy).
2. List the component of, and assemble the parts of the “phlebotomy formula.”
3. List the 5 “rights” of medication delivery. Compare and contrast all the methods of medication delivery.
4. Be able to recognize and manage complications from IM, SC, and venipuncture procedures.
5. Identify the correct color vacutainer tube for appropriate lab testing. Describe how the vacutainer works.
6. Counsel a patient before injection/venipuncture.
7. Demonstrate & describe the technique of IM/SC. IV placement, & venipuncture.
8. Correctly set up an IV line, including drip tubing and appropriate IV rate. Properly perform the technique of securing an IV line.
9. Describe the different types of IV needles (gauge, catheter, etc.), and identify the parts of a needle.

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**PHYSIOLOGY COURSE OBJECTIVES**

**Course Description:**

Physiology is a one-semester course designed to provide the physician assistant student with a basic understanding of the mechanisms by which the body functions. The course uses a systems approach to the human body in health and disease. Clinical correlations will be made to apply physiologic concepts to the practice of clinical medicine.

This course is divided into seven units: (subject to change)

1. Cardiac physiology
2. Pulmonary physiology
3. Renal physiology
4. Endocrine physiology (it may be covered in Endocrine-Medicine)
5. Neurophysiology
6. Gastrointestinal physiology

**1. Cardiac Physiology**

A. Objectives:

At the conclusion of this unit and completion of its required reading assignments, the student should be able to:

1. Identify the functions and components of the Cardiovascular System
2. Identify the internal and external structures of the heart
3. List the names and explain the function of the (4) four cardiac valves
4. Explain the role of the papillary muscles and chordae tendineae
5. Explain the function of the atria and ventricles
6. Trace the flow of blood through the heart
7. Define polarization and explain the events responsible for depolarization
8. Define the cardiac cycle and correlate cardiac activity with pressure and volume changes by explaining the cardiac cycle
9. Identify and explain the phases of the Cardiac Cycle
10. Correlate cardiac cycle with a simultaneous electrocardiogram and heart sounds
11. Compare an action potential of a cardiac pacemaker cell and contractile cell.
12. Define the following terms: resting potential, action potential, pacemaker potential, depolarization and repolarization
13. Describe the anatomy of myocardial cells and identify the location and functions of the following structures: myocyte, gap junctions, sarcolemma, T-tubules, sarcoplasmic reticulum, Actin myofilaments, Myosin myofilaments, tropomyosin, and troponin
14. Explain what occurs during the various phases of an action potential
15. Define and compare the absolute, relative and effective refractory periods
16. Explain how sympathetic and parasympathetic nervous stimulation affect heart rate, through its effect on pacemaker resting potential
17. Explain the excitation-contraction coupling mechanism
18. Define the role of Ca in contraction of cardiac muscle
19. Trace the path of normal electrical depolarization through the heart

20. Define a segment, interval, and zero potential on a normal EKG tracing
21. Describe the anatomy of an artery, vein and capillary and explain the differences
22. Explain the functions of arteries, arterioles, capillaries, venuoles, and veins
23. Explain the concept of vessel compliance and describe its role related to BP control
24. Describe the role of veins as compliant vessels and explain blood “reservoirs”
25. Describe how resistance, viscosity and blood vessel radius are related to flow
26. List phases of acute and long term local blood flow explaining the changes that occur
27. List the Starling forces and their effects on capillary filtration and reabsorption
28. Explain lymph origin and discuss mechanisms for return of lymph to the circulation
29. Identify three factors responsible for the formation of edema
30. List the vasoconstrictive and vasodilating substances involved in blood flow regulation, and briefly describe 2 characteristics of each
31. Define angiogenesis and list stimuli responsible for it, provide a clinical example
32. Describe three mechanisms that assist in venous return to the heart
33. Explain the concept of redistribution of blood flow based on tissue requirements
34. Define and calculate Pulse Pressure
35. Define and calculate Mean Arterial Pressure (MAP)
36. Define Stroke Volume, list the factors that affect
37. Define inotropy, chronotropy and dromotropy
38. Define the following and the factors that affect them: Systole, Diastole, Blood Pressure, Pulse rate, Contractility, LVEDV, LVESV, Ejection fraction
49. Explain and be able to calculate an unknown, when provided with values for:
  - .   $BP = CO \times SVR$  (TPR)
  - .   $CO = HR \times SV$
  - .   $LVEDP - LVESV = \text{Stroke Volume}$
50. Define the Frank-Starling mechanism
51. Describe the autonomic effects include sympathetic/parasympathetic “tone”
52. Explain the role of baroreceptors for acute blood pressure control
53. Explain the vasomotor changes that occur with standing
54. Produce an algorithm demonstrating events that help to maintain blood pressure during acute volume depletion
55. Explain the steps required to form of Angiotensin II, its effect on blood vessels, renal function and ultimately blood pressure
56. Define and identify the types of shock
57. Explain the three mechanisms that may produce a shock state
58. List cardiovascular responses to shock and heart failure
59. Identify common drugs used to treat heart failure and explain their mechanism of action, including, but not limited to:
  - .  digitalis
  - .  diuretics
  - .  angiotensin-converting-enzyme inhibitors

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## 2. Pulmonary Physiology

### A. Objectives

At the conclusion of this unit and completion of its required reading assignments, the student should be able to:

1. Name the structures and their functions as part of the respiratory system
2. List the two pulmonary circulations, and explain how they differ
3. Identify the muscles responsible for mechanics of breathing
4. Explain the concept of partial pressures and discuss how this helps diffusion of gases across the respiratory membrane
5. Name the lung volumes and capacities, and estimate values of each
6. Explain mechanisms by which O<sub>2</sub> and CO<sub>2</sub> are carried by the blood
7. List the factors affecting gas diffusion rates at the alveolus-capillary segment
8. Identify the oxygen-hemoglobin dissociation curve and list (4) factors responsible for shifts in the curve
9. Define cooperative binding of O<sub>2</sub> to Hemoglobin
10. Explain how humidification of inspired air affects PO<sub>2</sub> values at the alveoli
11. Identify the impact of pleural pressure changes on inspiration, expiration and forced expiration
12. Determine normal resting minute ventilation
13. Explain the pressure changes associated with an open pneumothorax
14. List and explain four (4) protective mechanisms of the respiratory tract, and discuss risk factors for pneumonia based on alterations of these mechanisms
15. Describe surfactant's role in respiration and how it affects the work of breathing
16. Explain briefly the pathophysiology of Respiratory Distress Syndrome of the newborn
17. List nervous control of the smaller airways including the nerves, neurotransmitters, and their effects on resistance to flow-give clinical examples
18. Define the two types of "dead space", give normal volumes for each type and list the structures responsible for them
19. Explain how physiologic dead space may increase, and give a clinical example
20. Define V/Q matching, explain how changes in ventilation may affect perfusion
21. List the components of the respiratory control centers and describe the functions of each

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### **3. Renal Physiology**

#### **A. Objectives:**

At the conclusion of this unit and completion of its required reading assignments, the student should be able to:

1. Describe the compartmentalization of the body fluids; intracellular fluid, extracellular fluid; and its sub-compartments
2. List the major ions and constituents, and their concentrations, in the intracellular and extracellular fluid compartments
3. Explain the meaning of internal environment and the importance of stable intracellular and extracellular environments
4. Describe how the nervous and endocrine systems communicate information in the body
5. Define the concept of body balance. Apply this concept to water or sodium
6. List the functions of the kidneys
7. Describe the structure of the renal glomerulus, renal tubule and the renal blood vessels
8. Discuss the three main processes involved in the formation of urine
9. Discuss the relationship of volume of glomerular filtrate, renal blood flow and urine volume
10. Describe the nature of the glomerular ultrafiltrate and the forces involved in its formation
11. Compare the functional features of a glomerular capillary and systemic capillary
12. Discuss the factors that affect the filtration rate
13. Discuss the concept of renal clearance
14. Explain how glomerular filtration rate is measured
15. Explain in general terms the process of tubular secretion and give examples of substances excreted by secretion
16. Discuss the magnitude of salt, glucose, amino acids, urea and water reabsorption
17. Describe the main mechanisms of reabsorption of sodium, glucose, amino acids and water in the proximal tubule, thick ascending limb, distal tubule and collecting tubule
18. Describe the effects of and cellular actions of antidiuretic hormone and aldosterone in the collecting tubule
19. Describe in general terms the mechanisms of production of osmotically dilute of concentrated urine
20. Describe the process of excretion of potassium
21. Discuss the body balance of salt, potassium and water
22. Define acid, base, pH and buffer
23. Discuss in general terms the metabolic processes that produces and consume hydrogen ions in the body
24. List the main buffers of the intracellular and extracellular fluids
25. Explain why the bicarbonate/CO<sub>2</sub> buffer pair is so important in acid-base homeostasis
26. Describe the response of the respiratory system to change in arterial blood pH or PCO<sub>2</sub>
27. Describe in general terms the renal regulation of blood pH by reabsorption of bicarbonate, excretion of titratable acidity and secretion of ammonia
28. List the four simple acid-base disturbances

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**4. Endocrine Physiology**

A. Objectives

At the conclusion of this unit and completion of its required reading assignments, the student should be able to:

1. List the hormones of physiological importance secreted by the adrenal cortex
2. Explain the role of ACTH in the control of the secretion of glucocorticoids and androgens by adrenal cortex
3. Describe the role of glucocorticoids in the response to fasting and stress
4. Explain the regulation of aldosterone secretion by angiotensin II
5. Describe the effects of the hormones secreted by the adrenal medulla
6. List the hormones produced by the thyroid gland
7. Explain the importance of dietary iodide for the synthesis of the thyroid hormones (TH)
8. Describe how TH are transported in the blood-stream
9. Explain the physiologic significance of the conversion of thyroxine to triiodothyronine by target cells
10. Describe the regulatory effects of TSH on thyroid size on secretion of TH
11. Describe the effects of TH on the development of the CNS, body growth, the basal metabolic rate of the body, and pituitary thyrotrophs
12. Explain the current concept of the cellular mechanism of action of TH
13. List main physiologic regulators of insulin and glucagon secretion
14. Describe, in general terms, the effects of insulin on carbohydrate, lipid and protein metabolism in the appropriate target tissues
15. Summarize the effects of glucagon on carbohydrate, lipid and protein metabolism in the liver
16. Identify the endocrine glands and hormones involved in male and female reproduction
17. Describe the negative feedback interactions between the hypothalamic, pituitary and testicular hormones
18. List the effects of androgens on target organs
19. Describe the temporal negative and positive feedback interactions between the hormones of the hypothalamus, pituitary and ovary during the different phases of the menstrual cycle
20. Identify the cell types and their functions in a mature follicle and corpus luteum
21. Describe the process of ovulation, corpus luteum formation and atresia
22. Outline the processes leading to menstrual bleeding
23. List the effects of ovarian steroids on reproductive and other tissues
24. Describe the physiologic actions of calcium and phosphate in the body and explain the importance of maintenance of serum levels of calcium and phosphorus for normal metabolic function
25. Describe the distribution of calcium and phosphate in the body and their main forms in plasma
26. List the important dietary sources of calcium and phosphorus and discuss the pathways involved in calcium and phosphate balance

27. Describe the cell types involved in bone growth and remodeling, and the processes of synthesis and breakdown of organic and inorganic components of bone
28. Discuss the regulation of parathyroid hormone secretion and the primary actions of this hormone
29. Describe the pathways involved in the synthesis of active Vitamin D and the primary actions of the hormone

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**5. Neurophysiology**

**A. Objectives**

At the conclusion of this unit and completion of its required reading assignments, the student should be able to:

1. Describe how the nervous system communicates information in the body
2. List the component parts of the central nervous system and describe their function in the processing of afferent and efferent neural transmission
3. Describe the somatotopic orientation of both the somatosensory cortex and the primary motor cortex
4. Compare and contrast membrane potentials and action potentials, and describe their roles in neurologic transmission
5. Describe various modes of sensory transduction including mechanical, chemical and photosensory transduction
6. List the various sensory receptors in the skin and differentiate among them
7. Describe the meaning of sensory adaptation and the means by which it occurs
8. Differentiate between the two divisions of the autonomic nervous system, and delineate the response of effector organs to stimulation by each division
9. Name the neurotransmitters in both divisions of the autonomic nervous system, of both preganglionic and postganglionic synapses
10. Describe the role and function of the adrenal medulla in the autonomic nervous system
11. Describe the role and function of the adrenal cortex in the autonomic nervous system
12. Describe the various cell types within the retina and their role in vision
13. Describe the function of the auditory system with regard to sensory transduction and the perception of sound
14. Describe the role of the inner ear in proprioception
15. Describe the concept of an across-fiber pattern code and its role in the perception of taste and smell
16. Contrast inhibitory synapses with excitatory synapses and be able to list examples of neurologic transmission involving both types
17. Map the afferent and efferent loops of three spinal reflexes

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**6. Gastrointestinal Physiology**

**A. Objectives**

At the conclusion of this unit and completion of its required reading assignments, the student should be able to:

1. List the structures of the gastrointestinal system
2. Describe the major function performed by each of the organs in the gastrointestinal system
3. Identify and explain the structures, secretions, motility and nervous control of each of the following processes:
  - Ingestion
  - Salivation
  - Mastication
  - Deglutition
4. Explain the gross structure, principal cells, functions, enzyme and non-enzyme secretions of each of the following organs:
  - Esophagus
  - Stomach
  - Pancreas
  - Gallbladder
  - Liver
  - Small Intestines
  - Large Intestines
5. Discuss the motility of the GI tract including responses to autonomic influence
6. Explain the process of acid secretion, and factors/substances that influence its production
7. Define each of the following:
  - “The law of the gut”
  - Brush Border
  - Primary Peristalsis
  - Secondary Peristalsis
  - Mixing/Segmental Peristalsis
  - Propulsive Peristalsis
  - Slow waves
  - Spike Potentials
  - Acinus
  - Duct cells
  - Chyme
  - Zymogen
  - Myenteric plexus
  - Submucosal plexus
  - Migratory Motor Complex (MMC)
8. Explain how “reflexes” in the gastrointestinal tract are protective to its structures
9. Discuss the following (4) four primary hormones of the gastrointestinal system, and include the major stimuli for secretion, site of secretion and its actions:
  - Secretin

- .  Gastrin
  - .  Cholecystokinin
  - .  Gastric Inhibitory Peptide
10. Explain the digestion process of carbohydrates, proteins, and lipids, including enzymes responsible, regions where its digestion is initiated, and the final products
11. Briefly explain the pathophysiology and treatment of the following gastrointestinal disorders:
- Achalasia
  - Gastroesophageal Reflux
  - Peptic Ulcer Disease
  - Zollinger-Ellison Syndrome
  - Lactose Intolerance
  - Cholelithiasis