CURRICULUM FOR

4 YEARS DEGREE PROGRAMME

IN

ORTHOTIC & PROSTHETIC SCIENCES

2017

RAWALPINDI MEDICAL UNIVERSITY

INTRODUCTION

Prosthetics and Orthotics (P&O) are essential areas of modern health care in which someone who has lost a degree of function through trauma, disease, a medical condition or congenital abnormality will be afforded physical rehabilitation with the aid of an appliance or device. Prosthetics concerns provision of an artificial limb (prosthesis) for someone that has lost their limb or part of their limb; orthotics concerns the provision of a brace (orthosis) to provide support, correction of a deformity or offer pain relief to a part of the body. In both cases practitioners will be required, through methodical patient assessment and an in-depth knowledge of human anatomy, physiology and function, to formulate a treatment plan for the fitting and follow-up of an appropriate device.

The curriculum of any higher education programme is its fundamental guiding document outlining the process by which the final qualification can be awarded. For this reason, the curriculum must be considered as a "living document" that should evolve with developments in practices and technology within and outside of the institution; therefore, it must be subjected to a periodic review process every 3-4 years to maintain its quality and relevance.

In a world of increasingly rapid development and access to information it becomes ever more important to have a methodical process by which consideration can be given to these changes and decisions taken on if and how the curriculum might reflect them. The resulting document will invariably add rigor to the education of P&O undergraduates that can only improve the quality of care to patients.

The importance of this curriculum is particularly significant for a country like Pakistan, which has huge unmet needs in terms of both physical rehabilitation facilities and human resources. The government and educational institutions are beginning to wake up to this truth and there is a growing wave of new physical rehabilitation centers and educational programmes, however, with this hasty establishment of new programmes, comes the risk of variable quality.

In Pakistan the prosthetics and orthotics needs are great; according to WHO estimates, 0.5% of the population requires P&O services, some studies even estimate a higher proportion. For Pakistan that equates to over 1 million people in need of P&O services. Currently it is estimated that only a small percentage of this need is being addressed and often by unqualified practitioners in poorly equipped workshops.

GOALS OF THE PROGRAMME

THE PURPOSE OF THIS ORTHOTIC AND PROSTHETIC DEGREE PROGRAMME IS TO PREPARE PROSTHETIST ORTHOTISTS WHO WILL:

1. Take primary responsibility for provision of prosthetic and orthotic treatment and provide this treatment according to nationally and internationally approved standards.

2. Provide care that is patient centered and evidence based, but arrive at clinical decisions through a process of analysis and critical thinking.

3. Serve as responsible members in the professional community and are willing and able to assume leadership roles in the communities they serve.

4. Be qualified to go on to higher levels of education such as post-graduate programmes.

5. Identify researchable problems, advocate and participate in research, and incorporate research findings into clinical practice.

6. Understand and place in context the social, economic and cultural issues of practice and effectively advocate for changes in policy.

7. Correlate theory with practice and think creatively about, react to, adapt or shape new practice environments.

8. Participate in and provide education for communities, patients, peers, students and others.

OBJECTIVES OF THE PROGRAMME:

GRADUATES OF PROSTHETICS AND ORTHOTICS PROGRAMME WILL BE ABLE TO DEMONSTRATE A RANGE OF COMPETENCIES REQUIRED AT ENTRY LEVEL TO THE PROFESSION.

1. **Apply knowledge of physical sciences, social sciences, health sciences, culture and natural sciences to professional practice.**
   - 1.1. Exemplify the role of the prosthetic/orthotic professionals in providing ethical, user-centered care.
   - 1.2. Assists social competence and cultural awareness.
   - 1.3. Ability to view the contemporary world from both local and global perspectives.
   - 1.4. Capacity to reflect critically on shared concerns and think of innovative, creative solutions guided by ethical standards.
   - 1.5. Ability to contribute personally and meaningfully to the community's development.

2. **Demonstrate effective and appropriate use of available technology in various communications.**
   - 2.1. Express thoughts and ideas effectively and proficiently.
   - 2.2. Demonstrate efficient and appropriate use of electronic media in producing documents.
   - 2.3. Demonstrate accuracy in documentation.
   - 2.4. Complement active listening and verbal communication with appropriate non-verbal signs.
   - 2.5. Demonstrate effective and appropriate use of available technology in various communications.
   - 2.6. Demonstrate the ability to document in accordance with professional standards in compliance with legal and funding requirements.
   - 2.7. Demonstrate the ability to document in compliance with data protection, copyright and privacy law.
   - 2.8. Demonstrates the ability for clinical communications by effectively sharing and interacting with others across the continuum of care.

3. **Participate in the development of practice management skills in various settings.**
    3.1. Apply the concepts of occupational safety and health in the delivery of prosthetic/orthotic services.
    3.2. Demonstrates the ability to identify goals appropriate to their practice settings: academia, clinical setting, community, homecare and/or industry.
    3.3. Utilize resources to ensure attainment of identified goals to optimize the impact of services.
    3.4. Demonstrates the ability to develop a plan within resources to ensure attainment of identified goals to optimize the impact of service.

4. **Work effectively in an inter/intra-professional collaborative setting.**
    4.1. Understand the role of the prosthetic/orthotic occupations in the healthcare continuum.
    4.2. Understand the role of other healthcare providers in the healthcare continuum.
    4.3. Awareness of the roles of users and other stakeholders.
    4.4. Demonstrate appropriate behavior as a productive member of the team.
    4.5. Demonstrate sensitivity and respect for the beliefs and values of others that may be different from one's own.
    4.6. Communicate effectively through verbal, non-verbal, and written forms when dealing with other stakeholders.

5. **Demonstrate social and professional responsibility and ethical behaviors in multi-cultural settings and scenarios.**
    5.1. Demonstrates an understanding of the ISPO Code of Ethics and/or an appropriate local Code of Ethics.
    5.2. Provide equal opportunities to everyone regardless of gender, race, religion, political affiliation, economic status, educational background, and societal position
    5.3. Demonstrating an understanding of the importance of supporting informed decision-making and establishing informed consent.
    5.4. Awareness and/or participation in national and/or international structures for health services governance.
    5.5. Understanding the importance of adherence to the principles of government and legislation.

6. **Demonstrate competence in conducting appropriate examination, evaluation, and assessment of users across the individuals' lifespan and within a broad continuum of care.**
    6.1. Utilize sound clinical reasoning skills in examination, evaluation, and assessment of users.
    6.2. Demonstrate the ability to participate in the inter/intra-disciplinary team.
    6.3. Demonstrates the ability to accurately and completely document results of examination, evaluation, and assessment according to accepted standards.
    6.4. Demonstrate the ability to communicate results of examination, evaluation, and assessment to users and other stakeholders.
    6.5. Demonstrate the ability to document and communicate prosthetic/orthotic service plans to meet standards for reimbursement and regulations of external agencies.
    6.6. Demonstrate the ability to determine the need for referral to appropriate qualified service providers before beginning treatment.
    6.7. Demonstrate the ability to select and utilize relevant, valid, reliable, and sensitive measures of clinical status or health outcomes to screen and/or determine the condition of users.
    6.8. Demonstrate the ability to formulate a treatment plan including outcome/s and follow up using evidence based practice.

7. **Optimize the use of appropriate equipment, materials, components and techniques in prosthetic/orthotic services.**
    7.1. Demonstrate the ability to use materials, equipment, tools, and components safely.
    7.2. Apply mechanical principles to devices to match the needs of users, including safety, bench alignment, and durability needs.
    7.3. Assess and adjust the operational quality, safety, and durability of the device to conform to prescription details.
    7.4. Demonstrate the ability to achieve appropriate aesthetic results for the individual user.
    7.5. Demonstrate the ability to select appropriate technology in various settings.
    7.6. Demonstrates an understanding of the process of introducing new and/or innovative technologies.
    7.7. Apply scientific principles in the use of materials and techniques.

7.8. Select appropriate cost effective materials, components and techniques relevant to the technical production process.

7.9. Select appropriate techniques for creating and modifying models of body segments in a logical and efficient manner.

8. Demonstrate competence in developing and implementing appropriate prosthetic/orthotic service plans for users across the individuals' lifespan within a broad continuum of care.

8.1. Demonstrates an understanding of the process of formulation for prosthetic/orthotic service planning.

8.2. Demonstrate the ability to effectively implement the technical production of appropriate prosthetic/orthotic devices in the local setting

8.3. Demonstrate the ability to evaluate the quality of technical aspects of the device.

8.4. Aptitude in solving problems systematically.

8.5. Demonstrate the ability to effectively create a model of the limb segment.

8.6. Demonstrate the ability to appropriately fit the limb-device interface (including static alignment).

8.7. Demonstrate the ability to effectively implement the dynamic fit and alignment of prosthetic/orthotic devices.

8.8. Demonstrate the ability to determine need for referral to appropriate qualified service providers as part of the continuum of care.

8.9. Aptitude in tackling problems methodically and scientifically.

8.10. Identify and prioritize evidence based solutions to problems that may arise in a prosthetic/orthotic service plan.

8.11. Demonstrate the ability to effectively implement prosthetic/orthotic service plans to address complex case management.

8.12. Formulate specific, measurable, attainable, realistic, and time-bound goals for users.

8.13. Demonstrate the ability to select, implement and interpret appropriate, self-report and performance-based outcome measures to assess achievement of user specific prosthetic/orthotic outcomes as compared to baseline measures.

8.14. Demonstrate the ability to evaluate outcomes of prosthetic/orthotic service plans in terms of the fit, function, and cosmesis of the device, and adjust the plan as needed.

8.15. Demonstrate the ability to determine the need for continuance of treatment or discharge from treatment.

9. Demonstrate, in a systematic and effective manner, the ability to impart knowledge when providing education for users, their caregivers, other health professionals, and the public at large.

9.1. Demonstrate an understanding of the importance of educating users, their support networks and the public at large in relevant aspects of prosthetic/orthotic services.

9.2. Demonstrate the ability to provide effective education to users, their support networks and the public at large.

9.3. Demonstrate the ability to contribute to professional development by providing effective education to peers, and/or other healthcare providers.

9.4. Demonstrate an understanding of the importance of feedback in supporting learning for self and others.

10. Demonstrate appropriate competencies in research and evidence based practice.

10.1. Understand the role of prosthetic/orthotic occupations in the development and use of evidence.

10.2. Understand the research process and levels of evidence.

10.3. Conduct a comprehensive search of evidence in libraries, databases and other sources using identified keywords.

10.4. Identify relevant clinical practice questions based on a particular context.

10.5. Critically appraise research articles using appropriate criteria.

10.6. Utilize valid research findings in evidence-based practice to focus on extracting the practical and clinical implications of research findings.

10.7. Demonstrate basic skills in conducting research.

10.8. Choose an appropriate research design and methodology.

10.9. Conduct an ethics-approved research protocol.

10.10. Select appropriate statistical analysis methods/models for data collected.

10.11. Document results of research according to a prescribed format.

10.12. Apply ethical principles and good clinical practice in health research.

10.13. Exercise integrity in the conduct of research.

10.14. Draft a research report in its publishable form.

11. Actively engage in lifelong learning activities.

11.1. Develop skills that will allow for effective self-assessment of levels of competence for performance of tasks in various practice settings.

11.2. Develop skills to engage actively in self-directed learning strategies / opportunities.

11.3. Develop an awareness of the importance of engaging actively in formal and informal continuing professional education activities to remain update

NOMENCLATURE AND DURATION

NOMENCLATURE:

The name of the degree program shall be Doctor of Orthotics & Prosthetics. The duration of the course shall be 4 years with structured training in a recognized department under a supervisor.

COURSE TITLE:

BSc (hons) Orthotics & Prosthetics

TRAINING CENTERS:

Allied hospitals of Rawalpindi medical university

COURSE DURATION:

Four years structured training in a recognized department under the guidance of skilled and trained supervisors.

COURSE SCHEME:

The training is spread over four years with a specific component for each year of training.

REVISED CURRICULUM OF ORTHOTICS & PROSTHETICS

1ST YEAR

Subjects	Theory hours	Lab hours	Total credits hours
Basic Anatomy	3	1	4
Basic Physiology	3	1	4
Behavioral sciences	3	-	3
Basic Pathology	3	-	3
Biochemistry	3	1	4
Islamiyat	2	-	2
Pakistan studies/ ethics	2	-	2
Introduction to computer	2	1	3

2ND YEAR

Subjects	Theory hours	Lab hours	Total credits hours
Musculoskeletal & Exercise Physiology	3	1	4
Pathology & microbiology	3	-	3
Biomechanics and Basic Mathematics	3	1	4
Material technology and Applied mechanics	3	1	4
Workshop technology	3	1	4
Orthotics 1 and Pedorthics	2	2	4
Introduction to Patient Care/ward anatomy	1	1	2

3RD YEAR

Subjects	Theory hours	Lab hours	Total credits hours
Prosthetics 1	2	2	4
Basic Radiology	3	-	3
Biostatistics	3	-	3
Mobility and rehabilitation aids	2	1	3
Workshop management and technical drawing	2	1	3
Psychology of disable	2	1	4
Community based rehabilitation	4	-	4

4TH YEAR

Subjects	Theory hours	Lab hours	Total credits hours
Orthotics 2	2	2	4
Prosthetics 2	2	2	4
Clinical orthopedics	4	-	4
Medicine	4	-	4
Supervised clinical practice	-	5	5
Research Project / Thesis			10

FIRST PROFESSIONAL YEAR

BASIC ANATOMY

(1) Introduction regarding

- Anatomical Nomenclature
- Life span of a human being
- Structural and functional organization
- Terminology and body plan
- Systematic Anatomy
- Basic organization of the body

(2) Skin

- The structure of the hypodermis, dermis. and epidermis.
- Superficial fascia and deep fascia

(3) The Musculoskeletal System:

Muscles, Bones and Joints

- Components of the Skeletal System
- Description of Axial & Appendicular Skeleton
- The process of bone ossification. Growth, Remodeling,and repair
- Main features of the skull including all views
- Shape and regions of vertebral column
- Important features of the regional vertebrae
- Bones of the thoracic cage, including the types of ribs.

- The bones of the pectoral girdle and upper limb
- The bones of the pelvic girdle and lower limb
- Various types of joints and types of joint movement
- connective tissue, components of the connective tissue matrix
- Description of skeletal muscle, smooth muscle and cardiac muscle
- Origin, insertion. synergist, antagonist and prime mover.
- The movements of the arm, forearm and hand and the involved muscle groups
- Muscles of the trunk and the actions they accomplish.
- Movements of the thigh, leg and foot with involved muscle groups

(4) The Nervous System

- Division of the Nervous System and the characteristics of each.
- Central Nervous System
- Peripheral Nervous System
- Autonomic Nervous System
- Special Senses
- Anatomical pathways and decription of:
- Olfactory system---- olfactory neurons
- Hearing and Balance , structure of the outer middle and inner ear
- Taste ---- taste bud.
- Visual --- chambers of the eye and structure of the rods and cones
- The structure of a neuron, nerve, nerve tract, nucleus, and ganglion.
- The components of a reflex arc and synapse

The three meningeal layers surrounding the central nervous system,

Cerebrospinal fluid and its circulation.

List the various cranial nerves

Various lobes of the brain and the cerebellum

(5) The Cardiovascular System

Anatomy of the Heart---- the size, shape and location of the heart and Chambers, valves and their locations

The location of the coronary arteries

The structure of the conduction system of the heart.

Pulmonary and systemic circulation

The structure of arteries, capillaries and veins.

Major arteries and veins and the body areas, they supply

Lymphatic system tonsils, lymph nodes, the spleen and the thymus.

(6) Respiratory System

The anatomy of the respiratory passages, beginning at the nose and ending with the alveoli.

The lobes of the lungs and the membranes that cover the lungs

Pleural cavity

The muscles of contraction of respiration

(7) The Digestive System

The structure of the organs that make up the digestive tract and their relations to other organs in thoracic and abdominal cavity

Blood supply of the organs of the GI tract

Important secretory glands, the liver and pancreas (both exocrine and endocrine components).

(8) Genito-Urinary System

- The structures and organs of the urinary system and its relations with other organs
- The structure of the nephron
- Formation of Sex Cells
- Organs of the Male Reproductive System
- Organs of the Female Reproductive System

Recommended Books:

- *Essentials of anatomy and physiology by Seely, Stephens, and Tate (4th ed)*
- *Anatomy & Physiology by Ross & Wilson*
- *General Anatomy by Laeeq Hussain*
- *General Anatomy by Dr Ghulam Ahmad*
- *Anatomy by D. R. Johnson & K. L. Moore*
- *Color Atlas of anatomy by Mc Minn*
- *Lasts Anatomy by R.M.H Mcminn*

BASIC PHYSIOLOGY

(1) Introduction To The Human Physiology

 Functional organization---relationship between structure and function of the human body

 Homeostasis – its importance-- negative and positive feedback mechanism

(2) Integumentary System

 Functions of the skin, hair, glands and nails

 Body temperature and its regulation

(3) The Musculoskeletal System:

 Functions of the bones and muscles

 Functional characteristics of Skeletal Muscle, Smooth Muscle and Cardiac Muscle

 The events of muscle contraction and relaxation in response to an action potential in a motor neuron.

 Distinguish between aerobic and anaerobic muscle contraction.

 Muscle hypertrophy and atrophy

(4) The Nervous System

Functions of the central nervous system,

 The functional areas of the cerebral cortex and their interactions.

 functions of the parts of the brainstem diencephalons, basal nuclei. Limbic system. And cerebellum.

 functions of various cranial nerves.

 Functions of the somatic motor nervous system

 Functions of the autonomic nervous system

 The function of neurons, neuroglial cells.and their components.

 Resting membrane potential and an action potential.

 The function of a synapse and reflex arc

(5) The functions of the specialized sense organs

 Eye---- physiology of site, accommodation, optic nerve and optic chiasma

 Ear---- functions of the internal, middle and external ear

 Physiology of the hearing and balance

 Smell---------- physiology of olfactory nerve

 Taste ---------physiology of taste

Location of the taste buds physiology of speech

(6) The Endocrine System

 Functions of the Endocrine System

 Chemical Signals, receptors and hormones

 The Endocrine Glands and their Hormones

 Other Hormones

(7) Blood

 Composition of Blood and Plasma

 Functions of Blood

 Formed Elements

 Stages of cell development

 Blood grouping

 Coagulation mechanism

(8) The Cardiovascular system

 Functions of the Heart

 Electrical Activity of the Heart origin and propagation of cardiac impulse

 Phases of the Cardiac Cycle

 Heart Sounds

 Regulation of Heart Functions--- intrinsic and extrinsic

 Functions of the Peripheral Circulation

 The Physiology of Circulation

o Pulmonary Circulation

o Systemic Circulation: Arteries

 Veins

 Local Control of Blood Vessels

 Nervous Control of Blood Vessels

 Regulation of Arterial Pressure

 The function of Lymphatic System, tonsils, lymph nodes, the spleen and the thymus.

(9) Respiratory System

 Functions of the Respiratory System beginning at the nose and ending with the alveoli.

 Ventilation and Lung Volumes

 Gas Exchange and gas transport in the blood

 Rhythmic Ventilation

(10) The Digestive System

 Functions of each organ of the Digestive System including major salivary glands

 Movements and Secretions in each organ of the Digestive System and their regulation

 Physiology of Digestion, Absorption, and Transport

(11) Genito-Urinary System

 Urine Production, Urine Movement

 Regulation of Urine Concentration and Volume

 Body Fluid Compartments

 Regulation of Extracellular Fluid Composition

 Regulation of Acid-Base Balance

 Physiology of Male Reproductive system—spermatogenesis and reproductive glands, hormones and their regulations

 Physiology of Female Reproductive system--- ovulation, hormones and their regulations

(12) Immunity

 Define immunity, Innate Immunity, Adaptive Immunity

 Antigens and Antibodies

 Primary and secondary responses to an antigen

 Antibody-mediated immunity and cell-mediated immunity

 Role of lymphocyte in immunity regulation

Recommended Books

 Essentials of Anatomy and Physiology by Seelay, Stephens and Tate. 4th edition

 Ross & Wilson Anatomy and Physiology.

 Human Physiology. Stuart Ira Fox. 7th edition

 Text Book of Medical Physiology Guyton

 Essential of Medical Physiology Vol.I & II by Mushtaq Ahmad.

 Lecture notes on human physiology by Bray JJ, Cragg, PA MacKnight

BEHAVIOURAL SCIENCES

1. Introduction to Behavioural Sciences and its importance in health.

Bio-Psycho-Social Model of Health Care and the Systems Approach

Normality vs Abnormality

Importance of Behavioural sciences in health

Desirable Attitudes in Health Professionals

2. Understanding Behaviour

Sensation and sense organs

Describe sensation, sense organs/special organs

Perception

Define perception, what factors affecting perception

Attention and concentration

Define attention and concentration. What factors affecting them

Memory

Define memory and describe its stages, types and methods to improving it

Thinking

Define thinking; describe its types and theories

What is cognition and levels of cognition?

Discuss problem solving and decision making strategies

Communication

Define communication. What are types, modes and factors affecting it. Describe ways to recognize non-verbal cues. Characteristics of a good communicator

3. Individual Differences

Personality

Define personality. What factors affect personality development? How personality can be assessed? Influence of personality in determining reactions during health, disease, hospitalization, stress

Intelligence.

Define intelligence and the various types of intelligence.

What factors affect it and how it can be assessed?

Emotions

Define emotions. What are the various types of emotions?

Emotional Quotient (EQ)- concept & utility

Motivation

Define motivation and what are the types of motivation?

4.Learning

Define learning, Principles of learning, modern methods and styles of learning, types of learners, Strategies to improve learning skills

5. Stress and Stressors

Define and classify stress and stressors

Relationship of stress and stressors with illness

6. Life Events

Concept of life events and their relationship with stress and illness

7. Stress Management

What is coping skills

What is conflict and frustration?

What is concept of adjustment and maladjustment?

8. Interviewing / Psychosocial History Taking

Define, types of interview and listening

Skills of interviewing and listening

9. Allied Health Ethics-Hippocratic oath

Do's and Don'ts

What is the concept of Allied Health ethics?

10. Culture and Allied Health practice

Concept of group, its dynamics

Attitude, value, belief, myths, social class, stigma, sick role and illness, health belief models

11. Psychological reactions

Grief and bereavement, Family and illness

Dealing with difficult patients

What are the psychosocial aspects of illness, hospitalization, rape, torture, terminal illness, death and dying?

Psychosocial issues in Emergency Departments, Intensive Care and Coronary Care Units, Operating Theatres, Cancer wards, Transplant Units, Anaesthesia

12. Breaking Bad News

Introduction, Models, Methods, Death of the patient, abnormal baby, intractable illness

13. Pain, Sleep, Consciousness

Concept of pain.

Physiology of pain,

Altered states of consciousness.

14. Communication Skills

Counseling,

Crisis Intervention

Conflict Resolution

Principles of effective communication, active listening, the art of questioning The art of listening.

Good and bad listener.

Counseling: Scope, Indications and Contraindications,

Steps, Do’s and Don’ts, How to deal with real life crisis and

conflict situations in health settings

KINESIOLOGY

INTRODUCTION TO KINESIOLOGY

- Definition of kinesiology
- Definition of rehabilitation

Mechanical Principles and Mechanics of Position

- Force - force system – Description of units.
- Gravity: Center of gravity and line of gravity
- Level of gravity
- Equilibrium
- Fixation and Stabilization

Mechanics of movement

- Axes /Plane
- Speed
- Velocity
- Acceleration
- Momentum
- Inertia
- Friction
- Lever - types - application
- Pulley - types - application
- Anatomical application of lever system and other pulley system application
- Angle of pull

INTRODUCTION TO MOVEMENT:

- The body levers
- Forces applied to the body levers
- Types of movement and posture
- Patterns of movement
- Timing in movement
- Rhythm of movement
- The nervous control of movement

STARTING POSITIONS:

- Definition
- Fundamental positions
- Standing
- Kneeling
- Sitting
- Lying
- Hanging
- The pelvic tilt

RECOMMENDED TEXT BOOKS:

1. *Practical exercise therapy* by Margaret Hollis
2. *Brunnstrom's Clinical Kinesiology*
3. *Clinical kinesiology and anatomy* by Lynn S Lippert

BASIC PATHOLOGY

Cell Injury and adaptation

Cell Injury

- Reversible and Irreversible Injury
- Fatty change, Pigmentation, Pathologic calcification
- Necrosis and Gangrene
- Cellular adaptation
- Atrophy, Hypertrophy,
- Hyperplasia, Metaplasia, Aplasia

Inflammation

- **Acute inflammation** --- vascular changes, Chemotaxis, Opsonization and Phagocytosis
- Enlist the cellular components and chemical mediators of acute inflammation
- Differentiate between exudates and transudate
- **Chronic inflammation**
- Etiological factors, Granuloma

Cell repair and wound healing

- Regeneration and Repair
- Healing--- steps of wound healing by first and second intention
- Factors affecting healing
- Enlist the complications of wound healing

Haemodynamic disorders

- Define and classify the terms Edema, Haemorrhage, Thrombosis, Embolism, Infarction & Hyperaemia with at least two examples of each.
- Define and classify Shock with causes of each.
- Describe the compensatory mechanisms involved in shock
- Describe the possible consequences of thrombosis
- Describe the difference between arterial and venous emboli

Neoplasia

- Define the terms Dysplasia and Neoplasia with examples of each
- Enlist the differences between benign and malignant neoplasms
- Enlist the common etiological factors for neoplasia

- Define and discuss the different modes of metastasis

Recommended Books

Pocket companion to Robbins.

Pathologic basis of disease Cotran, Kumar,Collins

BIOCHEMISTRY

- **Physiochemical Principles**
- Hydrogen ion conc. and pH notation
- Acidity & Alkalinity
- Indicators & Buffer solutions
- PH and its determination
- The colloidal state
- Absorption
- Structure and function of cell membrane and movement of materials across cell membrane
- Osmosis & Osmotic pressure
- Surface tension
- Viscosity
- **Carbohydrates**
- Introduction and classification of carbohydrates
- Some important monosaccharides, disaccharides and polysaccharides
- Regulation of blood glucose level
- Definition and end products of
- Glycolysis
- Citric acid cycle
- Glycogenolysis
- Glycogenoses
- Gluconeogenesis
- **Proteins and Amino Acids**
- Introduction, importance, classification and properties of proteins
- Entry of amino acids into cells and peptide linkage
- Special sources of proteins
- **Lipids**
- Introduction, Classification and Function of lipids
- Biosynthesis of fatty acids, natural fats or triglycerides
- Fatty acid oxidation
- **Vitamins and Minerals**

- Classification of vitamins
- Fat soluble vitamins and Water soluble vitamins
- Deficiency effects
- **Enzymes**
- Introduction, Classification Chemical nature and properties of enzymes
- The mechanism of enzyme reactions
- Factors affecting the enzyme activity
- Important coenzymes and their actions
- Regulatory enzymes
- **Nutrition and Dietetics**
- Balanced diet
- Role of carbohydrates, fats and proteins, their dietary sources and uses in the body
- Quantitative and qualitative daily requirements of carbohydrates, fats, proteins, vitamins and minerals

Recommended Books

- *Review of Biochemistry by Lippincott*
- *Essential of Medical Biochemistry Vol.I & II by Mushtaq Ahmad.*
- *Fundamentals of Biochemistry by D. Voet, J.G.Voet (1999)*
- *Text Book of Biochemistry with Clinical Correlations by T.M.Devlin.*
- *Modern Experimental Biochemistry by R.F.Boyer.*

INTRODUCTION TO COMPUTER

Introduction To Computers

- ***Definition*** Usage and functionality of computers
- Limitations of Computers
- Classification of Computers
- Basic Components of Computers
- ***Hardware***
- ***Software***
- System Software
- Application Software
- Equipment's/devices in Personal computer system
- Input devices
- Output devices
- Storage devices
- The processor
- **Microsoft Windows**
- ***Introduction to MS-Windows***
- Arranging, Moving and Resizing Windows.
- Identifying the components of desktop.
- Moving, Changing and Closing Windows.
- Crating, Opening and Deleting items and folders.
- Working with My Computer
- Deleting and Resume Print Jobs.
- Using Control Panel
- Working with Accessories.
- **Microsoft Office**
- ***Microsoft Win Word***
- Microsoft Excel
- Microsoft Power Point
- **Database**

- **Internet and Email**
- Introduction To Outlook Express
- Using Internet Explorer

SECOND PROFESSIONAL YEAR

MUSCULOSKELETAL & EXERCISE PHYSIOLOGY

- Brief description of physiologic anatomy and characteristics of skeletal muscles
- The skeletal muscle fiber
- Important differences between skeletal and smooth muscles.
- Mechanism of muscle contraction
- Initiation of muscle contraction
- The motor unit
- Muscle contraction, all or non law
- Definition, methods of obtaining muscle relaxation
- The reaction of degeneration.
- The muscle hypertrophy and atrophy
- Prevention of muscle atrophy
- Physical contracture of muscle following denervation.
- Group action of muscles
- Control of coordination
- Voluntary movement
- Pattern of movement
- Muscle training and fatigue
- Skin and muscle sensibility
- Spinal reflexes
- Conditioned reflexes
- Definition, anatomical presentation of correct posture
- Reflex regulation of movement and posture
- Difference between correct and incorrect posture
- The muscle in exercise
- Strength, power, flexibility and endurance of muscles
- The muscle metabolic systems in exercise
- Respiration in exercise

- The cardio-vascular system in exercise
- Body heat in exercise
- Body fluids and salt in exercise
- Drugs and athletes.
- Recording of muscular contraction
- EMG
- Rigor Mortis
- Myasthenia Gravis

Practicals

Experimental physiology; experiments to be done by the students:

1- Blood pressure and circulatory arrest of limb.

2- Effect of stimulation of vago-sympathetic trunk of frog.

3- Examination of radial pulse at rest and after exercise.

4- Determination of tidal volume at rest and after exercise.

5- Vital capacity and lung volumes.

6- Examination of heart and lungs.

7- Artificial respiration.

8- Muscle-nerve preparation

9- Simple muscle curve.

10- Effects of temperature on muscle.

11- Effects of load and calculation of amount of work done.

12- Effects of two successive stimuli on muscle curve.

13- Genesis of tetanus.

14.. Velocity of nerve impulse.

15- Effects of fatigue on muscle contraction.

Demonstrations On:

1- Recording of venous pulse, apex beat, radial pulse and cardio-vascular system examination.

2- Examination of CNS.

3- Decerebrate and spinal frog experiments on function of spinal nerve roots.

4- Decerebrate Cat.

5- Analysis of the expired air.

6- Blood plasma and serum.

7- Packed cell volume and ESR.

8- Blood gases and alkali reserve.

Recommended Books:

1. *Essentials of Anatomy and Physiology by Seelay, Stephens and Tate. 4th edition*
2. *Ross & Wilson Anatomy and Physiology.*
3. *Human Physiology. Stuart Ira Fox. 7th edition*
4. *Text Book of Medical Physiology Guyton*
5. *Essential of Medical Physiology Vol.I & II by Mushtaq Ahmad.*
6. *Lecture notes on human physiology by Bray JJ, Cragg, PA MacKnight*

PATHOLOGY & MICROBIOLOGY

Course Outline:-

Bacteriology And Virology

Introduction to Microbiology (bacteria, viruses rickettsia)

Classification, biological characters and pathology of the important microbes.

Sterilization

Different methods of sterilization.

Specific Pathology Of:

Skin:

Effects of radiation on various skin lesions.

Simple and malignant tumors of skin

Definitions of Various Skin Lesions:

Macule, Papule, nodule, vesicle pustule, bulla, scab, crust, erosion, fissure, ulcer lichenification, comedones, keratosis, dermatosis, acanthosis nigricans, molluscum contagiosum, pemphigus, scabes, lichen planus, psoriasis, urticaria, acanthosis, panniculitis etc.

Musculoskeletal System:

Bones:

Atrophic and hypertrophic conditions of bones

Congenital, developmental and hereditary abnormalities of bone and cartilage.

Traumatic bony lesions leading to osteoporosis, fractures

Heading of fracture

Non-union & malunited fracture

Pseudoarthrosis

Bone graft

Inflammatory and non-inflammatory lesions of bones.

Metabolic Diseases of Bone

Scurvy

Rickets

Osteomalacia

Renal dwarfism

Skeletal changes due to endocrine dysfunction

Miscellaneous groups of osteopathies

Secondary pulmonary hypertrophic osteoarthropathy

Bone cyst

Polystatic fibrous dysplasis of bone

Pagets disease of bone

Simple and malignant tumors of bone and cartilage.

Joints

Disease of joints

Infective arthritis; gonococcal, pyogenic, tuberculosis, syphilitic, mycotic etc.

Reheumatic arthritis

Degenerative joint disease (osteoarthritis).

Sero-negative and positive polyarthritis

Lyme disease (Lyme arthritis)

Bursitis

Metabolic arthritis: (a) Due to systemic disorders (b) Due to local disorders.

Muscles

Non-inflammatory myopathies

Inflammatory myopathies

Metabolic diseases

Denervation, muscular atrophy

Muscular dystrophy

Myositis

Myasthenia gravis

Torticolis

Dypuytern's contracture

Tendonitis

Tumors.

The Nervous System

Central Nervous System (CNS*)*

Common Circularory Disorders

Common inflammatory disease

Common Traumatic lesions

Common demylinating diseases

Common Neoplasias of the CNS

Common Metabolic Disorders

Common Degenerative Diseases

Peripheral Nervous System (PNS)

Peripheral Neuropathics

Nerve Trauma

Common Neuronal Tumors

Respiratory System

Pulmonary embolism

Infaraction and hemorrhage.

Adult respiratory distress syndrome (ARDS)

Neonatal respiratory distress syndrome (NRDS).

Atelectasis (Acquired, Neonatorum)

Chronic Obstructive Pulmonary Diseases (COPD)

Common interstitial (Restrictive)Lung Disease

Pulmonary Infections

Common Pulmonary Tumors.

Pleural effusion and pleuritis

Hemothorax, pneumothorax

Acute laryngitis

Carcinoma of larynx

Naso-pharyngeal carcinoma.

The Vascular System

Structure of BV

Diseases of large BV

Hemostasis and Thrombosis

Inflammatory diseases of BV

Aneusysms

Disorders of the veins

Lymphatic disorders.

Recommended Books:

1. *Pathology By Robins*

2. Introduction to Pathology by Weight

3. Lecture Notes on Pathology by Thomson and Cotton.

4. General pathology by Florey.

BIOMECHANICS AND BASIC MATHS

BIOMECHANICS:

- Basic terminology
- biomechanics, mechanics, dynamics, statics, kinematics, kinetics and anthropometries
- Scope of scientific inquiry addressed by biomechanics .
- Difference between quantitative and qualitative approach for analyzing human movements
- Biomechanics of human bone growth and development
- Biomechanics of Bone
- Biomechanics of Articular Cartilage
- Biomechanics of Tendons and Ligaments
- Biomechanics of Peripheral Nerves and Spinal Nerve Roots
- Biomechanics of Skeletal Muscles.

Biomechanics Of The Human Uper Extremity

- Factors that influence relative mobility and stability of upper extremity articulation .
- Muscles that are active during specific upper extremity movements .
- Biomechanical contributions to common injuries of the upper extremity
- Biomechanics of the Shoulder
- Biomechanics of the Elbow
- Biomechanics of the Wrist and Hand

Biomechanics Of Human Lower Extremity

- Factors influencing relative mobility and stability of lower extremity articulations
- Adaptation of lower extremity to its weight bearing functions
- Muscles that are active in specific lower extremity movements
- Biomechanical contribution to common injuries of the lower extremity
- Biomechanics of the Hip
- Biomechanics of the Knee
- Biomechanics of the ankle and foot

Biomechanics Of Human Spine

- Factors influencing relative mobility and stability of different regions of spine .
- Biomechanical adaptations of spine during different functions .
- Relationship between muscle location and nature and effectiveness of muscle action in
- the trunk
- Biomechanical contribution to common injuries of the spine and Trunk Orthosis.

Analysis Of Pathological Gait

- Terminology and description
- Total contact socket joint for prosthetic knees), monocentric' (single axis) poly centric
- (Multiaxis)
- Orthopaedic footwear--foot deformities
- Discussion on individual patients during gait cycle

BASIC MATHEMATICS

Arithmetic review:

Factorization,HCP,LCM,

laws of exponent

percent, Logarithms

Algebra

Algebraic expressions

Algebraic operations, factorization, solution of first order equation

Simultaneous linear equations.

Plain Geometry

Straight lines, angles, triangles

Reflection, displacement and rotation congruence of triangles

Parallel lines, polygons.

Quardrilaterals, parallelograms, circles, proportional segments, points dividing

segments in a given proportion

Areas of plane geometrical shapes.

Trigonometry

Trigonometry of the right angled triangle

Angle function

Trigonometric identities.

Vectors

Vectors algebra, Vector components, scalar and vector products.

Elements of Calculus

Function basic principles

Limit simple techniques of Differentiation of data in tabular and graphical forms

measures of location and dispersion

MATERIAL TECHNOLOGY AND APPLIED MECHANICS

MATERIAL TECHNOLOGY

Introduction to Material Used In Prosthetics and Orthotics

Metals

Mechanical testing of metals

Iron and cast iron

Plain carbon steels

Alloyed steels

Non ferrous metals and their alloys.

Wood

Structure types

Seasoning

Wood used in prosthetics

Leather

Sources

Tannage used of leather

Plaster of Paris

Chemistry and its uses.

Plastic raw materials

Resin and foam

Monomers, polymers

Production of plastics

Thermoplastics

Thermosetting plastics and elastomers

Polyurethane foam

Reinforcement materials

Application of plastics in orthopaedic technique

Joining of plastics

Welding, adhesives and their effect on structure and properties

Compressors, Vacuum pumps. Powder metallurgy.

Applied mechanics:

- Introduction and terminology
- Human locomotion

- Methods of investigating physiological locomotion
- Detailed analysis of physiological locomotion
- Scope of mechanics
- Units scalar/vector quantities
- Force resolution and summation forces
- Laws of forces and moments
- Plane frame analysis
- Free body diagrams
- Equation of equilibrium
- Newton laws of friction, linear/angular motion, relationships.
- Tangential and radial acceleration
- Centrifugal force projectiles
- Stress and strain, their relationship
- Work, energy, power and efficiency
- Momentum and impulse
- Inertia, moment of inertia
- Gravitational force, laws of gravitation.

Strength of materials:

- Polyethylene
- Low density polyethylene
- Polycarbonate
- Polypropylene
- Modified polypropylene
- Copolymer polypropylene
- Engineering plastics
- Carbon fiber
- Anodized aluminum
- Silicon
- Proflex
- Surlyn
- Polyethylene Terephthalate Glycol

- TPE (thermoplastic elastomer)
- Acrylonitrile butadiene styrene (ABS)

Recommended books:

- *Strength of Materials in Orthotic and Prosthetic Design Book by Thomas R. Lunsford*
- *Human Biomaterials Applications edited by Donald L. Wise, Debra J. Trantolo, David E. Altobelli, Michael J. Yaszemski, Joseph D. Gresser*

WORKSHOP TECHNOLOGY

Introduction to Workshop Technology

Hand Tools

Holding measurement.

Striking

Forging chipping

Hand shearing

Filling, sawing

Screw tapping

Grinding wheels

Cutting Tools

Cutting angles

Introduction to cutting speeds and feeds

Twist drills and drilling speeds.

Machining:

The lathe machine

Examples of chuck workface plate work

Face plate work and use of steadies

Taper turning, screw cutting

Calculation of gear training for English and metric pitches

The sensitive drilling machine

Its control and parathion

Use of drilling machine for spot facing

Counter boring and taping.

Milling Machines

Grinding machines

Wood work machines

Routers shaping machine

Wood and metal band saws

Planning machine

Vertical sanding machine

Welding and soldiering

Health and safety at work.

Practical Training

Basic Training In Workshop

Introduction to tools and machines, the practical training consists of basic workshop practice in metals, leather, forging, welding,soldering.

Introduction Of Orthosis

Making stirrup, Ankle foot Orthosis, Knee ankle foot Orthosis. The Orthosis are to be fitted on patient. There are demonstration on patients to show how the orthosis should be fitted and finished and their use.

Basic Training In Leather Techonology.

Introduction to leather shoes.DB splint, DB shoes.

Introduction to Workshop Technology

Hand Tools

Holding measurement. Striking, forging chipping, hand shearing, filling, sawing, screw tapping, grinding wheels.

Cutting Tools

Cutting angles, introduction to cutting speeds and feeds, twist drills and drilling speeds.

Machining:

The lathe machine, examples of chuck workface plate work, face plate work and use of steadies, taper turning, screw cutting, calculation of gear training for English and metric pitches, the sensitive drilling machine, its control and parathion, use of drilling machine for spot facing, counter boring and taping.

Material Technology

Introduction to Material Used In Prosthetics and Orthotics

Metals

Mechanical testing of metals, iron and cast iron, plain carbon steels, alloyed steels non ferrous metals and their alloys.

Wood

Structure types, seasoning, wood used in prosthetics. Leather sources, tannage used of leather, plaster of Paris, chemistry and its uses.

ORTHOTICS 1

UPPER LIMB AND SPINAL ORTHOSIS

Design construction and its principles of operation of UPPER LIMB AND SPINAL ORTHOSIS

Orthotics for diseases Upper extremity and spine

Finger Orthotics

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.

d. Identify the clinical considerations for use for different types of FINGER SPLINTS

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

Hand Orthotics

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.

d. Identify the clinical considerations for use for different types of FINGER SPLINTS

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

Wrist-Hand Orthotics;

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.

d. Identify the clinical considerations for use for different types of FINGER SPLINTS

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

Elbow Orthotics;

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.

d. Identify the clinical considerations for use for different types of FINGER SPLINTS

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

Elbow-Wrist-Hand Orthotics;

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.
c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.
d. Identify the clinical considerations for use for different types of FINGER SPLINTS
e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.
f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.
g. Demonstrate competency in fit assessment and improvement of these devices.
h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

Shoulder Orthotics;

The student must demonstrate the ability to:
a. Perform the expected performance criteria
b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.
c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.
d. Identify the clinical considerations for use for different types of FINGER SPLINTS
e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.
f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.
g. Demonstrate competency in fit assessment and improvement of these devices.
h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

Shoulder-Elbow-Wrist-Hand Orthotics.

The student must demonstrate the ability to:
a. Perform the expected performance criteria
b. Perform complete assessment including a detailed assessment to obtain information for formulating a ORTHOTIC treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a ORTHOTIC treatment plan.

d. Identify the clinical considerations for use for different types of FINGER SPLINTS

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of ORTHOSIS to enhance function.

PEDORTHOTICS

Common Pathologies in Pedorthotics Practice

ldentify the clinical aspects of common diseases, pathologies and deformities that involve the foot and ankle. These must include, but are not limited to:

1. Abnormal pronation
2. Abnormal supination
3. Convex pes valgus
4. Talipes calcaneovalgus
5. Posterior tibial tendon dysfunction
6. Metatarsalgia
7. Metatarsus adductus
8. Hallux rigidus
9. Hallux abducto valgus
10. Hallux adducto varus
11. Metatarsus adductus
12. Forefoot varus
13. Rearfoot varus
14. Forefoot valgus
15. Rearfoot valgus
16. Plantar flexed first ray
17. First ray insufficiency
18. Toe deformities
19. Tarsal coalitions
20. Plantar fasciitis

21. Morton’s neuroma
22. Hindfoot osteoarthritis
23. Midfoot osteoarthritis
24. Diabetic ulcerations
25. Musculoskeletal: fractures, post-surgical procedures
26. Neuromuscular: hereditary sensory motor disorders, spinal cord injuries, polio
27. Charcot changes in the diabetic neuropathic foot
28. Rheumatoid arthritis
29. Overuse syndromes
30. Pediatric disorders
31. Diabetes mellitus
32. Peripheral vascular disease
33. Trauma
34. Pediatric and congenital etiologies
35. Osteoarthritis in the foot and ankle

Treatment Modalities

Over-the-counter (OTC) Shoes

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform a lower limb assessment including a detailed foot assessment (rearfoot and forefoot alignment, subtalar and midtarsal stability and function) to obtain information for formulating a treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics of the lower limb in combination with a foot assessment to develop a treatment plan.

d. Identify the clinical considerations for use of off the shelf shoes for managing relevant pedorthic pathologies.

e. Explain the indications and contraindications for use of the commonly used shoe designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in footwear material and design selection and fit assessment and improvement.

Over-the-Counter (OTC) Arch Supports and Foot Care Products

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform a lower limb assessment including a detailed foot assessment (rearfoot and forefoot alignment, subtalar and midtarsal stability and function) to obtain information for formulating a pedorthic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics of the lower limb in combination with a foot assessment to develop a pedorthic treatment plan.

d. Identify the clinical considerations for use of OTC arch supports and foot care for relevant pedorthic pathologies.

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of both prefabricated and custom foot orthoses to enhance function and mobility. i. Use knowledge of shoe wear and modifications in the pedorthic treatment plan to optimize outcomes.

Custom Foot Orthoses

The student must demonstrate the ability to:

a. Perform the expected performance

b. Perform a lower limb assessment including a detailed foot assessment (rearfoot and forefoot alignment, subtalar and midtarsal stability and function) to obtain information for formulating a pedorthic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics of the lower limb in combination with a foot assessment to develop a pedorthic treatment plan.

d. Identify the clinical considerations for use of custom foot orthoses for relevant pedorthic pathologies.

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, impression and measurement acquisition (casting, foam impression), material and component selection and current fabrication processes for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of custom foot orthoses.

h. Understand the clinical indications and uses of both prefabricated and custom foot orthoses to enhance function and mobility.

i. Use knowledge of shoe wear and modifications in the pedorthic treatment plan to optimize outcomes.

Custom Molded Shoes

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform a lower limb assessment including a detailed foot assessment (rearfoot and forefoot alignment, subtalar and midtarsal stability and function) to obtain information for formulating a treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics of the lower limb in combination with a foot assessment to develop a treatment plan.

d. Identify the clinical considerations for use of custom molded shoes for relevant pedorthic pathologies.

e. Demonstrate competency in impression and measurement acquisition, and material and component selection.

f. Demonstrate competency in fit assessment and improvement of custom molded shoes.

INTRODUCTION TO PATIENT CARE/WARD ANATOMY

INTRODUCTION TO PATIENT CARE

- The profession
- Healthcare policy
- Multi disciplinary approach in heath care
- Preparations for patient care
- Patient management and its component
    - Evaluation
    - Diagnosis
    - Prognosis
    - intervention
- History taking
- Standards of practice for orthotics & prosthetics
- Code of ethics
- Component of examination process
- Purpose of documentation
- Various models of disablement and their similarities and differences
- Short term goals and long term goals
- Strategies to improve patient adherence and compliance
- Referral to other appropriate health care providers

POSTURE:

- Inactive postures
- Active postures
- The postural mechanism
- The pattern of posture
- Principles of Re- Education
- Techniques of Re-Education
- Prevention of muscles wasting
- The initiation of muscular contraction
- Strengthening methods
- Abnormal postures

MUSCLE STRENGTH AND MUSCLE ACTION:

- Types of Muscles contraction
- Muscles tone

- Physiological application to postural tone
- Group action of muscles
- Overview of muscle structure
- Types of muscle work
- Range of muscle work
- Group action of muscles
- Two joint muscle work
- Active and passive insufficiency
- Group movement of joints
- Muscular weakness and paralysis

PRACTICAL TRAINING:

- Fundamentals of muscle testing
- Methods of muscle recording
- Basic muscle grading system
- Evaluation of posture
- Regional upper limb muscle testing as the region is covered in Anatomy
- Practical demonstrations of muscles work and its ranges
- Practical demonstrations of various fundamental positions and posture analysis.

THIRD PROFESSIONAL YEAR

PROSTHETICS 1

UPPER LIMB PROSTHESIS

Wrist Disarticulation Prosthesis,

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a prosthetic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a prosthetic treatment plan.

d. Identify the clinical considerations for use for different types of socket

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of prosthesis to enhance function.

Tans-Radial Prosthesis,

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a prosthetic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a prosthetic treatment plan.

d. Identify the clinical considerations for use for different types of socket

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of prosthesis to enhance function.

Trans-Humeral prosthesis

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a prosthetic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a prosthetic treatment plan.

d. Identify the clinical considerations for use for different types of socket

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of prosthesis to enhance function.

Shoulder Disarticulation Prosthesis.

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a prosthetic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a prosthetic treatment plan.

d. Identify the clinical considerations for use for different types of socket

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of prosthesis to enhance function.

PSYCHOLOGY OF DISABLED

- Introduction to psychological stresses due to physical disability
- Major psychological problems originated as a result of being handicapped
- Self-esteem of handicapped persons
- Intferiority complex and disability
- Psychological and physical dependency among physically disabled
- Counseling and psychological support.
- The role of the family, child with the disability, parents of the disabled child.
- Acceptance of severely disabled persons.
- Social-sexual relationships
- Independent living.

SOCIOLOGY

- Definition
- Subject matter
- Sociology
- The science of society.

SOCIAL ACTION AND INTERACTION

- Social processes
- Co-operation
- Competition
- Conflict and Accommodation.

SOCIAL GROUPS

- Primary-Secondary
- In and Out Group
- Reference group.

SOCIALIZATION AND PERSONALITY

- Socialization and personality formation

SOCIAL INSTITUTION

- Meanings
- Social stratification
- Meanings and Forms (Classes and Castes).

SOCIAL AND CULTURAL CHANGE

- Factors of promoting and resisting social change.

RECOMMENDED TEXT BOOKS:

1. *Text book of Community Medicine by: Park J E. Latest Edition*
2. David, Tucket (ed), 1976, An Introduction to Medical Sociology, Lahore, Tavistock Publication.
3. Horton, Paul B. and Chester L. Hunt, 1984 Sociology, Singapore: McGraw Hill Book Co.

BIOSTATISTICS

WHAT IS STATISTICS?

Definition of Statistics, Population, sample Descriptive and inferential Statistics, Observations, Data, Discrete and continuous variables, Errors of measurement, Significant digits, Rounding of a Number, Collection of primary and secondary data, Sources, Editing of Data. Exercises.

PRESENTATION OF DATA:

Introduction, basic principles of classification and Tabulation, Constructing of a frequency distribution, Relative and Cumulative frequency distribution, Diagrams, Graphs and their Construction, Bar charts, Pie chart, Histogram, Frequency polygon and Frequency curve, Cumulative Frequency Polygon or Ogive, Historigram, Ogive for Discrete Variable. Types of frequency curves. Exercises.

MEASURES OF CENTRAL TENDENCY:

Introduction, Different types of Averages, Quantiles, The Mode, Empirical Relation between Mean, Median and mode, Relative Merits and Demerits of various Averages. properties of Good Average, Box and Whisker Plot, Stem and Leaf Display, definition of outliers and their detection. Exercises.

MEASURES OF DISPERSION:

Introduction, Absolute and relative measures, Range, The semi-Inter-quartile Range, The Mean Deviation, The Variance and standard deviation, Change of origin and scale, Interpretation of the standard Deviation, Coefficient of variation, Properties of variance and standard Deviation, Standardized variables, Moments and Moments ratios. Exercises.

PROBABILITY AND PROBABILITY DISTRIBUTIONS.

Discrete and continuous distributions: Binomial, Poisson and Normal Distribution. Exercises.

SAMPLING AND SAMPLING DISTRIBUTIONS:

Introduction, sample design and sampling frame, bias, sampling and non sampling errors, sampling with and without replacement, probability and non-probability sampling, Sampling distributions for single mean and proportion, Difference of means and proportions. Exercises.

RECOMMENDED TEXT BOOKS:

1.BIOSTATISTICS and research methodologies by Muhammad Ibrahim

2. Walpole, R. E. 1982. "Introduction to Statistics", 3rd Ed., Macmillan Publishing Co., Inc. New York.

3. Muhammad, F. 2005. "Statistical Methods and Data Analysis", Kitab Markaz, Bhawana Bazar Faisalabad.

4. Gay. L.R. (1987) Educational Research: Competencies for Analysis and Applications Columbus: Merrill.

5. Spiegel, Murray R.: Theory & Problems of Statistics, Sehawm Publishing Co., New York.

RADIOLOGY

Terminology

Nomenclature of Anatomy and Terms

Plans & Positions

The theory underlying basic radiographic skills

BASIC INTERPRETATION OF MUSCULO-SKELETAL IMAGING OF COMMON LESIONS IN:

Paediatric Radiography

The Skull

The Temporal Bones

Facial Bones

The Upper Limb

The Shoulder

The Lower Limb

Hip Joints and Pelvis

The Vertebral Column

Bones of Thorax

Skeletal System Survey

The Respiratory System & Heart

The Abdomen and Pelvic Cavity

Foreign Bodies

Special Investigations (procedures)

Contrast Studies

Myelography

Sinograms

Arthography

Tomography

MRI.

Practical:

General: Demonstration of different conditions& relevant x-ray films, how to read from x-ray, how to measure the deformity from xray, its simple assessment and P&O management technique.

MOBILITY AND REHAB AIDS

- Manual wheelchairs
- Walkers
- Power wheelchair
- Toilet Wheelchair / Bath Chair
- Special cushions for wheelchairs
- Inserts (seating systems) for wheelchairs
- Hospital beds
- Complete Fowler beds + Hi-Low, hydraulic and electrical
- Mattresses for reducing the risk of bedsores
- Home lifts - electrical and hydraulic
- Prefabricated compression garments
- Corsets
- Elastic wraps
- Neck collars
- Slings
- Supplemental oxygen - apply and adjust
- Supportive taping

Assistive Walking Devices:

- Canes,
- Forearm Crutches,
- Walkers (Standard Walker, Posterior Support Walker, Rollator Walker, Forearm Walker)
- Stair climbing aids - in special cases
- Standing wheelchairs for children and adults.
- Tilting tables
- Parallel bars

Devices And Equipments Uses And Training

Emergency Assistance to a Person with a Mobility Handicap who uses a Power Wheelchair

Injury Prevention Or Reduction With Use Of Devices And Equipment.

WORKSHOP MANAGEMENT

Introduction:

Principles of Administrative and Management structure

Industrial Management,

Definition of Organization

Principles of good organization

Type of Organisational setup

Workshop administration and management.

Man management:

Introduction, Discipline, Security, distribution of work, Work sheet, Time sheet and staff welfare.

Store purchase:

Store and store organization.

Inventory Control. Purchase organization.

Introduction to

Cost Accounting.

Use of computer for effective store management.

Safety: Industrial accidents, safety and hazards

Planning: Planning of Prosthetics and Orthotics Workshop all types of various scales.

Workshop layout, plant Layout.

Costing, billing

Documentation especially development of recording system to manage individual's records.

Construction:

Construction, ventilation, electrification, colour scheme, lighting, Sanitary convenience

Further expansion and accessibility of Prosthetic and Orthotic Workshop and fittings.

Practical: Either to design and develop a workshop or to carry out a project for layout of a workshop for prosthetics and orthotics work or workshop of similar nature.

TECHNICAL DRAWING

General laments of design

principle of drawing

viewing projections

first and third angle projection;

auxiliary views and sections;

use of drawing standards;

application of machining tolerances;

simple assembly drawings;

applications in orthopaedic technology.

rules and standard dimensioning, fits and tolerances

Drawing Ankle foot Orthosis with its components.

Drawing of lower limb braces

-FO and its types

-AFO and its types

-KAFO and its types

-HKAFO and its types

Drawing of spinal braces

COMMUNITY BASED REHABILITATION

Introduction to physical medicine and rehabilitation

General: introduction to health care system, rehabilitation in health care, rehabilitation under various Ministries

Concept of total rehabilitation, rehabilitation team and role of each member of the team

Introduction to impairment, disability and handicap

Background to social, political and economic issues in Pakistan and other low income countries.

Introduction to disability issues, government schemes, initiatives and legislation

What is Community Based Rehabilitation and its need

Simple knowledge about other disabilities Its prevention and its management

To understand the role of key Players in Community Based Rehabilitation

Referral facilities where to refer when to refer

Role of other professionals in Community Based Rehabilitation

Role of prosthetics & orthotics professionals in Community Based Rehabilitation

Early identification and early intervention

How to work as a team in Community Based Rehabilitation structure

Simple techniques to make Community Based Rehabilitation activities more purposeful.

Introduction to Community Based Rehabilitation as compared to the existing medical model and its function.

Access, adaptations and change of environment where people live or work.

Non governmental organisations and its role in prosthetics & orthotics.

Local resources available and referral

Income generation schemes

Structure and functions of social institutions

Vocational rehabilitation

Outline of educational aspects, job analysis, job placement

Employment, self-employment

Environment barriers

Professional and social work in medical setup

Difficulties of patient in use of appliances

Introduction to general Medicine and Common diseases

Chemical and physical agents causing diseases

Outline of metabolic disorders eg. Diabetes mellitus, deficiency diseases e.g. Vit. D

deficiency and vit. C deficiency.

Introduction to sports injuries, common sports injuries and their orthotics management

Rehabilitation therapy: introduction to physiotherapy and occupational therapy

Principles of clinical examinations, diagnosis and treatment.

Different aspects of physical medicine and Rehabilitation.

FORTH PROFESSIONAL YEAR

ORTHOTICS 2

Shoe Modifications

The student must demonstrate the ability to:

a. Perform the expected performance

b. Perform a lower limb assessment including a detailed foot assessment (rearfoot and forefoot alignment, subtalar and midtarsal stability and function) to obtain information for formulating a treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics of the lower limb in combination with a foot assessment to develop a treatment plan.

d. Identify the clinical considerations for use of shoe modifications for relevant lower limb pathologies.

e. Demonstrate competency in safe use of equipment, material and component selection and current fabrication processes for various shoe modifications.

UCBL Orthoses

The student must demonstrate the ability to:

a. Perform the expected performance

b. Perform a lower limb assessment including a detailed foot assessment (joint mobility, rearfoot and forefoot alignment, subtalar and midtarsal stability and function) to obtain information for formulating an orthotic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics of the lower limb in combination with a foot assessment to develop an orthotic treatment plan.

d. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

e. Demonstrate proficiency in design selection, casting and measurement acquisition, material selection and fabrication processes for UCBL's.

f. Demonstrate competency in fit assessment and improvement of UCBL's.

g. Understand the clinical indications and use of UCBL's to enhance function and mobility.

h. Use knowledge of shoe wear and modifications in the orthotic treatment plan to optimize outcomes.

Subtalar Control Foot Orthoses (SCFO)

A SCFO is defined as a custom device designed to manage the function of the anatomy distal to the ankle joint by primarily controlling the ROM of the subtalar joint; the proximal height does not extend beyond the junction of the gastrocnemius and the Achilles tendon. A SCFO is a method of treatment for conditions related to the foot demanding additional surface area to control forces. The student must demonstrate the ability to:

a. Perform expected performance

b. Select and employ appropriate evaluation methods to obtain accurate information for use in formulating a comprehensive orthotic treatment plan.

c. Apply knowledge of anatomy, biomechanics and pathomechanics to develop a comprehensive orthotic treatment plan.

d. Formulate comprehensive orthotic treatment plans to meet patient needs using subtalar control foot orthoses

e. Explain the indications and contraindications for use of the common SCFO designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in impression and measurement acquisition, material selection, and knowledge of fabrication processes for SCFO designs

g. Demonstrate competency in fit assessment and improvement of SCFOs

h. Understand the use of SCFOs for enhancing function and/or decreasing pain.

i. Use knowledge of shoe wear and modifications in the orthotic treatment plan to optimize outcomes.

j. Understand and explain the limitations of the orthotic Scope of Practice and how it relates to the use of SCFO's in orthotic treatment.

Toe-filler / Partial Foot Prosthetic Inserts

The student must demonstrate the ability to:

a. Perform expected performance.

b. Perform a lower limb assessment including a detailed residual limb assessment (subtalar and talocrural joint range of motion; length assessment of the gastrocnemius, soleus and tibialis posterior; skin integrity; pressure/load tolerant and intolerant tissues and structures), prosthetic device history and activity level (past, current and future expectations) for use in formulating a orthotic treatment plan.

c. Apply knowledge of kinesiology, biomechanics and pathomechanics to describe the force between the patient and the prosthesis during loading and unloading throughout gait. Explain the biomechanical mechanism for development of an equinovarus deformity. Discuss biomechanical

rationale for the addition of a rocker sole and shank to the shoe, including discussion of design principles for rocker placement. Compare and contrast the biomechanical differences between partial foot prosthesis designs that incorporate the ankle vs. designs that do not incorporate the ankle.

d. Demonstrate competency in impression and measurement acquisition, material and component selection, and knowledge of accepted techniques for the fabrication of the following partial foot designs (for transmetatarsal and more distal partial foot amputations): 1. Partial foot orthosis / toe filler 2. Rocker sole, sole stiffener and heel lift

e. Demonstrate competency in fit assessment and improvement of partial foot prosthetic inserts.

f. Explain the indications and contraindications for use of the common designs and materials relative to patient diagnosis and clinical presentation.

g. Use knowledge of shoe wear and modifications as part of the orthotic treatment plan to optimize outcomes.

Ankle-Foot Orthoses (AFO)

The student must demonstrate the ability to:

a. Perform expected performance

b. Select and employ appropriate evaluation methods (MMT, ROM, sensory testing, gait analysis, postural evaluation) to obtain accurate information for use in formulating a comprehensive orthotic treatment plan.

c. Apply knowledge of anatomy, biomechanics and pathomechanics to develop a comprehensive orthotic treatment plan.

d. Formulate comprehensive orthotic treatment plans to meet patient needs and achieve goals using the following prefabricated AFO devices (the goal of a AFO device is the treatment of foot pathologies): 1. Night splint 2. Boot type AFO (pressure relief or pneumatic walker)

e. Demonstrate competency in measurement acquisition and design and size selection for these specified AFO designs.

f. Demonstrate competency in fit assessment and improvement of these devices.

g. Understand and explain the clinical indications and use of these AFOs for enhancing function.

h. Use knowledge of shoe wear and modifications in the orthotic treatment plan to optimize outcomes.

i. Understand and explain the limitations of the orthotic Scope of Practice and how it relates to the use of AFO's in orthotic treatment.

Knee Ankle-Foot Orthoses (AFO)

Knee braces

Hip knee ankle foot orthosis.

MEDICINE

Etiology

Simple account of the condition with anatomical and physiological application

Principle sign and symptom

Outline of medical treatment

Clinical case discussion and demonstration will be taught by the Physicians and the principles of rehabilitation and the details of physiotherapy will be given by the Physiotherapy instructors

Rheumatology And Bone Disease

Arthritis:

Osteoarthritis, Rheumatoid arthritis

Connective tissue diseases,

Arthitis in children

Infective arthritis

Arthritis following infection

Crystal disease

Arthritis associated with other diseases.

Back Pain:

Back pain due to serious disease

Inflammatory back pain

Disc disease

Mechanical problems

Soft tissue problems

Psychogenic back pain

Non-specific back pain

Neck pain.

Soft Tissue Rheumatism:

Bone Diseases:

Peget's disease

Infections of bone

Neoplastic disease

Skeletal dysplasia

Other hereditary diseases.

Respiratory Diseases

Diseases of the Upper Respiratory Tract:

The common cold

Sinusitis, Rhinitis, Pharyngitis

Acute larygotracheobronchitis

Influenza

Inhalation of the foreign bodies

Diseases of the Lower Respiratory Tract

Acute & Chronic Bronchitis

Bronchiectasis

Cystic fibrosis

Astluna, Emphysema, Pneumonias, Tuberculosis, Pulmonary fibrosis

Radiation damage

Common tumours of the Lungs

Respiratory failure

Adult respiratory distress syndrome (ARDS)

Disorders of Chest Wall and Pleura:

Chest Trauma

Deformities of the Rib cage

Dry Pleurisy, Pleural Effusion, Empyema, Pneumothorax.

Renal Diseases

Anaemia

Brief description of types of Anaemia

Brief description of bleeding and Coagulation disorders

only Haemophilia and Thrombosis will be described in detail.

Miscellaneous Diseases

Brief description of Diabetes mellitus and its Complications

Detailed description of Diabetic neuropathy & Diabetic foot

Steroids induces myopathy.

Cardio Vascular Disease

Cardiac Diseases

Cardiac Arrhythmias

Cardiac Failure

Ischaemic Heart disease

Myocardial Infarction

Rheumatic fever

Valvular heart disease

Congenital heart diseases

Pulmonary heart disease

Pericardial disease

Systemic Hypertension

The heart in Pregnancy.

Vascular Diseases

Arteriosclerosis

Acute & Chronic ischaemia of the leg

Aortic aneurysms Buerger's disease, Raynaud's disease, Variocose veins, Venous thrombosis.

Dermatology

Introduction to disorders and disease

Acne vulgaris, Psoriasis, Boils, Carbuncles, Alopecia, Mycosis fungoides, Polymorphic light eruption (PLE), Vitiligo, Pityriasis, Hyperhidrosis.

Diseases Of The Brain And Spinal Cord

Sleep, Unconsciousness and Coma

Common Neurological Symptoms

Neurological Examination

The Brain Death

Stroke, Types of Stroke

Parkinson's Disease Epilepsy"

Multiple Sclerosis

Infective And Inflammatory Diseases

Intracranial tumours

Hydrocephalus, Headache, migraine & facial pain

Head injury

Motor neuron disease

Diseases of the Spinal Cord

Diseases of the Common Cranial nerves

Peripheral nerve Lesions

Diseases of the Voluntary muscles and of neuromuscular junction.

Recommended Books

1- Practice of Medicine by Davidson.

2- Clinical Medicine by Parveen J Kumar & Michaell, Clark.

PROSTHETICS 2

Below Knee Prosthesis:

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a prosthetic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a prosthetic treatment plan.

d. Identify the clinical considerations for use for different types of below knee prosthesis

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of prosthesis to enhance function and mobility.

Above Knee Prosthesis:

The student must demonstrate the ability to:

a. Perform the expected performance criteria

b. Perform complete assessment including a detailed assessment to obtain information for formulating a prosthetic treatment plan.

c. Apply knowledge of normal anatomy, normal and abnormal biomechanics, in combination with assessment to develop a prosthetic treatment plan.

d. Identify the clinical considerations for use for different types of below knee prosthesis

e. Explain the indications and contraindications for use of the common designs and materials with relation to patient diagnosis and clinical presentation.

f. Demonstrate competency in device selection, measurement acquisition, and material and component selection for various functional and accommodative designs.

g. Demonstrate competency in fit assessment and improvement of these devices.

h. Understand the clinical indications and uses of prosthesis to enhance function and mobility.

CLINICAL ORTHOPEDICS

Introduction, Principles of Orthopaedics

Physical disability and its causes

Injuries and trauma leading to disability

Deformities, congenital and acquired.

Fracture, types, fracture bracing and management

Infections of bones, soft tissue, joints

Inflammation:

Osteomyelitis

Inflammation of Joints

Rheumatoid Arthritis,

infective arthritis

Tuberculosis arthritis

Osteoarthritis

Ankylosing spondylitis

Arthritis of hemophilic Joints

Neuropathic joints.

Inflammation of Tendon sheath and bursae

Contructures, Posture etc.

Metabolic diseases of bones, e.g. rickets, osteomalacia, gout, scurvy etc.

Poliomyelitis and all its effect.

Spine: Outline of Tortocolis, cervical rib, spina bifida,

Scoliosis kyphosis, Lordosis, spondylosis, prolapse of intervertebral disc.

Hip: Outline of Dislocation (congenital, traumatic, pathological, paralytic and spastic)

Coxa-vara, coxa-valga.

Knee: Outline of Meniscal tears, dislocation of patella, genu valgus, genu varum, genu recurvatum

Ligamentous injuries

Ankle & foot: Outline of Sprain (acute and chronic),

C.T.E.V., Calcaneo varus and Pes Valgus, Hallux

Valgus and varus, calcaneal spur, Metatarsalgia, plantar fascitiis, Anaesthetic feet, Bunion

Shoulder: Outline of Recurrent dislocation, Bicipital tendinitis and periarthritis.
Elbow: Outline of Cubitus varus and valgus, Madelung's deformity, Tennis elbow, Volkmann's contracture, Dupuytren's disease, claw hand, De Quervain's disease and claw hand.
Wrist & Hand: Tenosynovitis, mallet finger, carpal tunnel syndrome
Amputation Surgery
General: Indications/causes, General Principles, Types of amputation, i.e. Guillotine, Flap, Osteoplastic Myoplastic, Osteo-myoplastic. Individual's Preparation for prosthesis. Ideal stump.
Preoperative, operative and postoperative prosthetic management techniques in general amputation
Congenital limb deficiencies and its universal classification
Ischemic limbs
Neurological disorders
Hemiplegia, paraplegia
Burns
Skin disorders.

- Introduction amputation
- Types of amputation
- Indications for amputations
- Amputation in special circumstances, like in infants and children, elderly persons and malignancy
- Indications for surgery
- Types of incisions
- Wounds, types of wounds, factors affecting wounds healing, care of wounds
- Bandages and dressing
- Trauma and metabolic response to trauma
- Detailed description of chest and abdominal trauma
- Hemorrhage, hemostasis and blood transfusion
- Classification and brief description of shock
- Fluid and electrolyte balance

- Classification of body fluid changes
- Pre, intra and post operative fluid therapy
- Surgery and diabetes
- Burns and grafts
- Neoplasia
- Preoperative assessment & preparation
- Post operative treatment, complications and their management
- Types of anaesthesia
    - □ Local anaesthetic agents
    - □ Regional anaesthesia (spinal and epidural)
- Intravenous anaesthetic agents
- Muscle relaxants
- Inhalational anaesthetic agents
- Anaesthesia and associated diseases.
- Complications of anaesthesia.
- Perioperative management.
- Cardiopulmonary Resuscitation. CPR.
- Recovery from anaesthesia.
- Pain management and postoperative care.
- Ulcers, sinuses and fistulas
- Transplantation
- Brief description of operation performed on: oesophagus, stomach, intestine gall bladder, bile duct, spleen, pancreas, liver, abdominal wall, hernias, breast, kidneys, ureters, prostate, peritoneum, mesentery and retroperitoneal space

RECOMMENDED BOOKS:

1. Apley's systems of orthopedics and fractures by Louis Solomon 9th ed, publisher holder Arnold.