

MUHS SYLLABUS OF BACHELOR OF PROSTHETICS AND ORTHOTICS
(SECOND YEAR)

Orthopaedics Theory

General : Introduction to Bone & Joint disorders.

Inflammation of Bones : Osteomyelitis, Periostitis, Inflammation of Joints :

Osteoarthritis, Rheumatoid Arthritis, Infective Arthritis, Tuberculous Arthritis, Ankylosing Spondylitis, Arthritis of rheumatic fever, Haemophilic joints, Neuropathic joints.

Soft Tissues : Inflammation of Tendon sheath and bursae, Fascia, contractures, Metabolic diseases of bones : Rickets, osteomalacia, gout, scurvy.

Spine : Traumatic injuries, Koch's spine, Torticollis, Cervical rib, Spondylolisthesis, Scoliosis, Kyphosis, Lordosis, Spondylosis, Intervertebral disc prolapse.

Hip : C.D.H., Traumatic, Pathological, Paralytic Spastic, Dislocation, Coxavara, Coxa valga.

Knee : Cartilage, lesions, dislocation of patella, genu valgum, genu varum, genu recurvatum OA of knee.

Ankle & Foot : Sprain (acute & chronic), C.T.E.V., calcaneus, pes valgus, hallux valgus and varus, calcaneal spur, metatarsalgia, plantar fascitis, cavus foot, rocker bottom foot.

Shoulder : Recurrent dislocation, biceps tendonitis and peri arthritis. Elbow, Forearm Wrist and hand : Cubitis varus and valgus, madelung deformity, Tennis elbow, Volkman's contracture, Dequevarans disease, Claw hand, Dupuytren's contracture, Tenosynovitis, Mallet finger, Carpal tunnel syndrome.

Radiology : 1. Normal Bones and joints of Upper Extermity, Lower Extermity, Spine and pelvis, Radiological measurement.
2. Cognenital abnormalities of the Upper and Lower Extermities, Congenital malformation of the spine.
3. Fracture, dislocation of Bones and joints of Upper Extermity, Lower Extermity and spine. Avascular necrosis of bones.
4. Inflammatory diseases of Bones and joints :- Osteomyelities, Tuberculosis of Bone and Joints, Osteochondritis.
Inflammatory Arthritis :- Rheumatoid Arthritis, Ankylosing spondylitis, Neuropathic joints.
5. Degenerative joint deseases :- Osteo arthritis.
6. Bone and joint changes in Paralytic lesions.
7. Tumours and cysts
8. diseases due to disturbance of growth. Metabolic disorders :- Osteoporosis, Rickets, Osteomalacia. Endocrine induced bone diseases. Bone affected due to disorder of the haemopoietic system.

Physiotherapy and Occupational Theory.

Physiotherapy: Introduction to Physiotherapy, and scope.

Theory: Assessment of muscle strength, Manual muscle testing, Contractures, R.O.M.

Therapeutic exercises, Pain management, Electro Diagnosis and Electrotherapy, Hydrotherapy, Suspension therapy.

Normal human locomotion, Gait analysis, assessment and Gait training. Prescription check up and evaluation of Gait with Orthotic/Prosthetic appliances and ambulation aids. Role of Physiotherapy in UMN and LMN disorder. Role of Physiotherapy in paediatric neuro musculsketal conditions. Such as cerebral palsy, congenital anomalies

meningomyelocele, club foot etc. Physiotherapy in Hemiplegia, Paraplegia, Muscular dystrophy Amputation and Arthritis of Degenerative/Inflammatory in origin.

Occupational Therapy:

Theory: Introduction to Occupational therapy. Upper Extremity Assessment, Principles of hand function assessment and tests, Activities of Daily Living and Functional Evaluation. Technological assistive devices – prescription & training. Principles of environmental assessment and modification, Special needs for severely disabled. Role of O.T. in following disabling conditions: Amputations, U.M.N and L.M.N. paralytic conditions, C.V.A., Arthritic conditions, Spinal Cord injuries, Brain injuries, Cerebral Palsy, Muscular Dystrophy, Meningomyelocele, Brachial Plexus injuries. Traumatic hand conditions, Congenital anomalies, burns.

Practical : Practical aspects of Physio and Occupational therapy.

Prosthetics Lower Extremity:

Theory :

Introduction : Introduction to prosthetics, definitions of various terminologies, various materials used in prosthetics components of prosthesis in general.

Lower Limb Prosthesis: Historical development in lower extremity prosthetics, lower extremity, Components, Socket, Suspension system, Hip joints, Knee mechanism. Ankle and various types of feet. Fitting and alignment technique.

Check Out Procedure : Check out procedure and testing. Training in lower extremity prostheses. Management of bilateral lower limb amputees. Adaptation for bilateral lower limb amputees.

Prosthetics Practical : Introduction to prosthetic material and tools. Handling of tools, safety precautions, general principles of manufacturing.

Prosthetics Lower Extremity:

Biomechanics : Below Knee biomechanics. Below knee gait analysis and deviations.

Biomechanics of Syme's prostheses. Above Knee Biomechanics, Biomechanics of partial foot prostheses. Above Knee gait analysis and deviations. General socket Biomechanics, Below Knee socket Biomechanics. BK alignment Biomechanics, AK socket Biomechanics. AK alignment Biomechanics. Hip disarticulation and knee disarticulation biomechanics and alignment principles.

Prosthetics Theory:

Prosthetic Feet : Various types of Prosthetic feet. Conventional foot, Rocker, SACH foot, Modified SACH foot, Jaipur foot, Seattle foot, Ountum foot, Peg Roelite foot, Carbon copy foot. Comparison studies of prosthetic feet.

Ankle joint : Single axis, double axis, multi axial, heel height adjustment, adjustable ankle.

Knee joint : Single axis knee joint, poly centric knee joint, free knee, constant friction, variable friction knee joint, swing phase control knee joint and stance phase control knee joint.

Hip joint : types of hip joints, single axis, sower type hip joint,

Partial foot prostheses : Various type of partial foot prostheses, partial foot, prosthetic component, partial foot prosthetic biomechanics, material used for partial foot prostheses, partial foot prostheses, wrap casting, fabrication technique for partial foot prostheses.

Gait analysis : Partial foot prostheses, gait analysis. Gait deviation in partial foot prostheses.

Partial foot prostheses check out procedures.

Syme's prostheses : Various types of Syme's Prostheses, prosthetic component, prescription principles. Materials used for Syme's principles, Casting technique, cast modification, fabrication

techniques for Symes PTB prostheses. Fabrication technique for Symes conventional prostheses. Symes gait analysis and deviations, Symes check out procedures.

Below Knee Prosthesis : Various types of Below Knee Prosthesis. Below Knee Prosthetic component. Below Knee Biomechanics. Below Knee Prescription Principles, Materials used for Below Knee Prosthesis. Casting technique for PTB Prosthesis. Cast modification. Fabrication technique for PTB prosthesis. Fabrication technique for BK conventional prosthesis. Below knee gait analysis and deviations. Below knee check out procedures.

Through Knee Prosthesis : Various types of Through Knee Prosthesis. Through Knee Prosthetic component. Through Knee Biomechanics. Through Knee Prescription principles. Materials used for Through Knee Prosthesis. Cast technique for Through Knee Prosthesis. Cast modification. Fabrication technique of Through Knee Prosthesis. Through Knee gait analysis and deviation.

Through Knee check out procedure. **Above Knee Prosthesis :** Types of Above Knee Prosthesis. Above Knee Prosthetic Component. Above Knee Biomechanics, Above Knee Socket shape and clinical consideration. Casting technique for plastic socket. Cast modification for plastic socket. Fabrication technique for Above Knee conventional Prosthesis. Knee joint mechanics, Above Knee Prescription principles. Above Knee gait analysis and Above Knee check out procedures.

Through Hip Prosthesis : Various types of Through Hip Prosthesis. Through Hip Prosthetic component. Through Hip Biomechanics. Through Hip prescription principles. Materials used for Through Hip Prosthesis. Casting techniques for Through Hip Prosthesis. Cast modification. Fabrication technique of Through Hip Prosthesis. Through Hip gait analysis and deviation. **Prosthetic Practical :** Fabrication of Partial foot. Fabrication of Symes PTB Prosthesis. Fabrication of Below Knee PTB Prosthesis. Fabrication of Below Knee PTS Prosthesis. Fabrication of Below Knee conventional prosthesis. Fabrication of Through Knee Prosthesis. Fabrication of Above Knee Prosthesis plastic socket. Fabrication of Above Knee conventional Prosthesis. Fabrication of Through Hip Prosthesis. **Orthotics Lower Extremity (LEO) Theory :** Definitions of orthoses, principles of designs of lower extremity orthoses, objectives and indications for orthoses (LEO).

Lower Extremity Orthotics :

Theory:

Different types of Orthoses, A.F.O., K.A.F.O., H.K.A.F.O., orthoses for C.D.H., C.P., Paraplegics, Legg Calve Perthes Diseases (LCPD), Spina Bifida, Leprosy. Orthotic components. Prescription Principles. Knee orthoses. Orthoses for fracture - tibia and femur. (Weight relieving orthoses). Floor Reaction Orthoses. Low cost orthoses. Study of biomechanics of each of the above designs of orthoses. Orthoses in Lower Motor Neuron Disorders.

Orthoses in Upper Motor Neuron Disorders. Orthoses in • Progressive Muscular Dystrophy. Orthoses in Juvenile Disorders. Orthotic Training Procedures. Gait analysis and check out procedures.

Orthotic Practical : Fabrication of Different types of Orthoses. Fabrication of A.F.O., K.A.F.O., H.K.A.F.O. Plastic A.F.O., Knee orthoses. Fabrication of Weight relieving orthoses. Floor Reaction Orthoses. Fabrication of Bilateral H.K.A.F.O. Low cost orthoses.

Biomechanics:

Kinesiology : Movements of human body in degree with respect to plane. Line of gravity. Angle of hip, knee, ankle joint at the time of gait cycle. Gait analysis. Study of the position of center of gravity of human body. Kinetics and Kinematics. Study of Lever system related to the human body, Free body diagram, Force System: Linear Force System-- Problems. Parallel force system--Problems. Concurrent force system--Problems. General force System-- Problems.

Internal force system & External force system Biomechanics of foot, Biomechanics of ankle, Biomechanics of knee, Biomechanics of hip, Biomechanics of hand, Biomechanics of spine, Strength of bones, ligaments and tissues, Friction & friction in the human body joints.

Physical Medicine & Rehabilitation:

Concept of “holistic Rehabilitation” Team work for Rehabilitation. International classification of Impairment, disability and handicap. Strategies of Rehabilitation. Intrinsic and Extrinsic factors for Rehabilitation. Policy & Legislatures. Epidemiology of disability. Disability Profile. RCI Act – 1985. PWD Act – 1995. CPA. CBR. Primary, secondary and tertiary levels of prevention of disability. Functional assessment and specific rehabilitation programs for poliomyelitis Cerebral Palsy/Myopathy. Traumatic and Infection. Sequelae of bones and joints. Myelomeningocele. Spinal Cord Injuries. Stroke. Nutritional disorders. Burn contracture. Common paediatric locomotor disorders. Low backache. Cardiac respiratory rehabilitation.

Mobility and Walking Aids :

Canes, Walking Sticks, Crutches (axillary & elbow) and modifications of crutches, canes and walkers and their attachments, modification of walkers, wheelchairs and their accessories, Special modifications of wheelchairs, motorized wheelchairs, triwheeler, two wheeler, three wheeler and four wheeler modifications for the disabled, Training with various mobility aids, seating devices for seated mobility in children, wheelchair assessment and training.

Footwear Technology:

Anatomy of foot, Bio-mechanics of foot related to footwear, C&E heels, Valgus pads Lateral wedge, Pain in the forefoot & anterior flat foot, M.T. pads all types, Scooped heel Pointed heels, Floating heels (all types), High heels and without heels, SACH heel, Sarbo under the heel.

Standard footwear and construction of different types of orthopaedic footwear Measurement and Checkout of the footwear.

C.P. footwear, Paraplegic footwear, Hanson footwear, Cavus footwear.

Measurement of the discrepancy in limb length & compensation footwear.

Shoes with filler, Equinus footwear & moulded footwear.

C.T.E.V. deformity, Dennis Brown splint, Over corrected footwear, Straight and stiff footwear, C.T.E.V. spints, Hallux valgus, Hammer toe, Hallux rigidus, Calcaneum deformity, Materials Tools and Machines used for footwear.

Practical:

Valgus pads (all types), Wedges, Sarbo under heel, C & E heel

Prepare one pair of footwear for trial,

Prepare one pair of footwear for final,

Prepare wooden last (all types)

INTERNAL EXAMINATION ASSESSMENT SUBJECTS (COLLEGE)

Pathology theory:

General : General aims and objectives of study of pathology various terminologies. An outline of the basic mechanisms of diseases process. Immunity and Hypersensitivity. Metabolic disorders.

Inflammation: Various changes, acute and chronic inflammation. Repair of tissues. Degeneration : Ischemia, necrosis, gangrene, thrombosis, embolism and infarction. Thrombo-angitis obliterans. Infections : Viral, bacterial and fungal infections. Neoplasia: Benign and malignant, spread. Pathology of Locomotor Pathology of bones, infection, trauma, growth disturbances. System Disorders of bones, muscles and joints.

Malformations, healing of fractures. Nervous System: Diversity and behaviour of microorganisms, Opportunistic pathogens and their control, body response to infection and injury, including role of skin, mucous membranes, phagocytes, serum and tissue proteins, inflammatory responses, specific immune response, development of abnormal cells. Pathological changes in muscles, bones, joints and nerves in common conditions like poliomyelitis, neuropathies, myopathies, cerebral palsy and thrombo-angitis obliterans, leprosy, etc. Demyelinating diseases. Pathology Practical Demonstration and specimens.

Ergonomics:

General: Definitions and scope in modern industrial society. Studies on machine of man oriented topics. Displays devices for transmitting information from machine to man, controls in information from man to machine. Safety factors, pollution, noise, atmospheric pollution time. Motion study in relation to Ergonomics principles.

Sociology:

General:

Introductions, Sociology and Society, Definitions, Nature of social organization, types of organization structure and functions of social institutes village as a community, social changes, social problems. Social welfare vocational rehabilitation, employment, self-employment removing environmental barriers recreation for the disabled community welfare organizations social welfare programmes.

SCHEME OF EXAMINATION : SECOND YEAR B.P.O.							
Sr. No.	Subjects	Theory	Internal Assessment	Term Work	Practical /Oral	Seminar	Time
1.	Orthopaedic Radiology	80	20	-	-	-	
2.	P.T. & O.T.	40+40=80	10+10=20	-	-	-	
3.	Prosthetic Lower Extremity	80	20	100	100	20	
4.	Orthotic Lower Extremity	80	20	100	100	20	
5.	Bio-Mechanics	80	20	-	-	-	
6.	Introduction in Rehabilitation	40	10	-	-	-	
7.	Mobility Aids	80	20	50	-	20	
8.	Foot Wear Technology	80	20	50	-	20	
	Total	600	150	300	200	80	
INTERNAL ASSESEMENT SUBJECTS							
Sr. No.	Subjects	Marks Distribution	Remarks				
1	PATHOLOGY	50 (40 + 10)	Internal assesement - Mini test will be given 1st in first half & 2nd in second half. Term Work - The candidate will be				

			prapering job / journal & submit to college authorities. Which will carry marks as indicated.
2	ERGONOMICS	50 (40 + 10)	
3	SOCIOLOGY	50 (40 + 10)	

As per direction number 22/2001 on "Conduct of Examination" issued on 08/08/2001. There will be three heads of passing & passing will be 50 % in each head.

1. Theory
2. Practical + Oral
3. Internal Assessment (Theory + Practical)

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