

**COURSE TITLE: Biomechanics, Workshop Management, Clinical Sciences,
and Clinical Practice**

STUDY HOURS: 60+160

PAPER : 01

Term : 4th

MARKS

THEORY 120

PRACTICAL: 30

TIME: 03HRS

**COURSE CONTENTS STUDY HOURS
(Theory +Practical)**

A. Biomechanics 20+60

A1. Introduction

- A1.1 Terminology
- A1.2 Definitions
- A1.3 Planes and axes

A2. Human Locomotion.

- A2.1 Definition of commonly used concepts
- A2.2 Characteristic of the normal human gait cycle

A3. Biomechanics of Syme and partial foot Prosthetics

- A3.1 Socket designs
- A3.2 Suspension of Syme prosthesis
- A3.1 Alignment consideration

A4. Transtibial Prosthetics

- A4.1 Generalities
- A4.2 Biomechanics
- A4.3 Dynamic alignment principles and their influence period
- A4.4 Different prosthetic types:
 - A4.4.1 Conventional prosthesis
 - A4.4.2 The PTB type
 - A4.4.3 The KBM type
 - A4.4.4 The PTS type

A5. Transfemoral Prosthetics

- A5.1 Generalities
- A5.2 Construction
- A5.3 The three-dimensional static alignment
- A5.4 Socket systems and designs
- A5.5 Containment methods for the residual limb
- A5.6 Suction containment valves and their location
- A5.7 Diagnostic/evaluation sockets
- A5.8 Analysis and troubleshooting

B. Workshop Management 20+50

B1. Introductions –

B1.1 Managers' skills

B2. Planning, The 7 – D scheme

B3. Stock control:

- B3.1 Ordering
- B3.2 Storing
- B3.3 Issuing
- B 3.4 Controlling

B 4. Finance:

- B 4.1 Budgeting
- B 4.2 Cost calculation
- B 4.3 Invoicing, receipting and accounting

B 5. Clinic management:

- B 5.1 Appointment systems, record keeping
- B 5.2 Property management
- B 5.3 Management of conflicts
- B 5.4 Continuous Assessment

B 6. Applied Accounting

- B 6.1 Control of inventories
- B 6.2 Determination of the cost and margin of different services
 - B 6.2.1 Legal and fiscal aspects
- B 6.3 Determination of direct and indirect costs
- B 6.4 Calculation of depreciations

C. Clinical Sciences**20+50****C1. Rehabilitation**

- C 1.1 Concept
- C 1.2 Philosophy and definition
- C 1.3 Objectives
- C 1.4 Stages of the rehabilitation process
- C 1.5 Importance of the multidisciplinary teamwork
- C 1.6 Role of the orthotic-prosthetic professional
- C 1.7 Community Based Rehabilitation Strategies (CBR)

C 2. Disability

- C 2.1 Concept and definition
- C 2.2 Classification
- C 2.3 Effective International Norms
- C 2.4 Disability rights

C 3. Technical Aids For People With Disability

- C 3.1 How to choose the appropriate orthotic support
- C 3.2 Selection approaches
 - C 3.2.1 Environment
 - C 3.2.2 Physical activities that the person carries out
- C 3.3 Basic knowledge of ergonomics

C 4. Prosthetic Procedure

- C 4.1 Patient examination;
- C 4.2 Measurement and casting;
- C 4.3 Cast rectification;
- C 4.4 Dynamic alignment, fitting and delivery.
- C 4.4 The clinic team, functions and members;
- C 4.5 Prosthetics and orthotics personnel;
- C 4.6 Ethical considerations;
- C 4.7 Prosthetics and orthotics care systems

RECOMMENDED BOOKS:

1. Bio Mechanic:
 - Hanger Herbert Blair Lower Limbs Prosthetic New York, 1982, O, 557P
 - Michael W. Whittle, Gait Analysis, An introduction, 1993, Bullerworth Heinemann Ltd. X, 230P
 - Margareta Nordin, Victor H. Frankel, Basic biomechanics of the Musculoskeletal System, Philadelphia and London, Lea and Febiger 1994.
 - I.A. Kapandji, The Physiology of Joints, Volume I and II, New York, Churchill Livingstone, 242P and 268P
 - Advanced Biomechanics Orthotics and Prosthetics
2. Workshop Management:
 - Wehrich H, and Koontz. H., Management, New York, Mc, Graw-Hill Inc, 1993, XXXVI, 744P
3. Clinical Orthopaedics:
 - G. Murdoch, Amputation Surgery and Lower Limb Prosthetics, London, Blackwell Scientific Publications, 1988, xxii, 470P
 - Andre, R. Baehler, Technical Orthopaedic Indications, Bern Verlag Hans Huber, 1996, 592P
 - G.K Rose, Orthotics Principles and Practice, London, William Heinemann Books, 1986, 273P

COURSE TITLE: Applied Communication, clinical Placement and Professional Practice

STUDY HOURS: 60+160

PAPER : 2

Term : 4th

MARKS

THEORY 120

PRACTICAL: 30

TIME: 03HRS

COURSE CONTENTS STUDY HOURS

(Theory +Practical)

A. Communication

30+30

A1. Description

In this unit the trainee learns about the communication process and reflects on their own communication skills.

A2. Objectives

At the end of the course the trainees will be able to:

- A2.1 Describe the process of communication
- A 2.2 Identify barriers to communication
- A 2.3 Identify different types of communication
- A 2.4 Describe different types of leadership
- A 2.5 Demonstrate and describe the importance of leadership in groups
- A 2.6 Explain the functions and qualities of an effective leader
- A 2.7 Describe a group and different types of groups.
- A 2.8 Describe and explain the Group dynamics.
- A 2.9 Problem solving in groups.
- A 2.10 Demonstrate the process of conducting an effective meeting
- A 2.11 Demonstrate the ability to communicate effectively with their peers.
- A 2.12 Reflect on their own communication skills

3. Communication Contents:

- A3.1 What is Communication?
- A 3.2 Importance of good communication.
- A 3.3 Verbal and non – verbal communication.
- A 3.4 Barriers to communication.
- A 3.5 Aspects of effective communication.
- A 3.6 Communication in organizations.
- A 3.7 Types of leadership.
- A 3.8 Importance of leadership in groups.
- A 3.9 Functions of leader.
- A 4.0 Qualities of a good leader
- A 4.1 Groups and types of groups.
- A 4.2 Group dynamics.
- A 4.3 Problem solving on groups
- A 4.4 Importance and procedures of meetings
- A 4.5 Conducting meetings

B. Clinical Placement

30+30

B1. Rationale:

A key component to producing fully competent graduates is practice in a clinical setting. By placing, students in a functioning clinical service and requiring them to provide real patients with treatment will allow them to fully develop their theoretical and practical skills. They will also become familiar with a clinical setting including referrals, record keeping, appointment systems, liaising with other health professionals, etc.

B2.Aims:

At the end of the placement students will be competent in treating the full range of disabilities requiring P&O devices.
Students will become familiar with the operation of a functioning clinic

B3.Assessment

Each device produced will be assessed by lecturing staff, the average mark from all devices produced will be used to calculate a mark for the clinical placement.

B4. Expected Clinical Placement Productionoo

Device	# required
Trans-Tibial	10
Ankle Disarticulation	3
Partial Foot	2
Trans-Femoral	5
Knee Disarticulation	2
Total Devices	22

C. Professional Practice

100

C1. Production Of Different Types Of lower Limb Prosthetic Devices

- Module 4: Trans Tibial Prosthesis
- Module 5: Knee Disarticulation Prosthesis
- Module 6: Trans Femoral Prosthesis

C2. Module 4: Trans Tibial Prosthesis

C2.1 Description

In this unit the trainee learns about the different designs and processes involved in the fabrication of the Trans Tibial Prostheses. He/she also learns the biomechanics of the Trans Tibial Prosthesis checkout and the prosthetic gait analysis.

C2.2 Objectives

- At the end of this unit the trainees will be able to:
- C2.2.1** Describe advantage ,disadvantage ,indication and contraindication of Transtibial socket design and its suspension.
- C2.2.2** Prescribe the required prosthesis with appropriate component.
- C2.2.3** Demonstrate the use of specific materials and tools and carry out the fabrication of the following designs of Trans Tibial prosthetic sockets:
- C2.2.4** Patellar Tendon Bearing (PTB)
- C2.2.5** Patellar Tendon Bearing Supra Condylar (PTBSC)
- C2.2.6** Patellar Tendon Bearing Supra Condylar Supra Patellar (PTBSCSP)
- C2.2.7** Fabricate the following Prostheses:
- C2.2.8** Trans Tibial Prosthesis - Trans Tibial (conventional)
- C2.2.9** Trans Tibial - (Trans Tibial) endoskeletal prosthesis (ICRC components)
- C2.2.10** Demonstrate different types of suspension used for Trans Tibial Prostheses and fabricate cuff suspension.
- C2.2.11** Describe the biomechanics and carry out gait analysis of Trans Tibial Prosthesis.

C2.3 Contents

- C 2.3.1 Prescription principles.
- C 2.3.2 Socket design and fabrication – PTB, PTBSC, PTBSCSP(PTS)
- C 2.3.3 Different types of Trans Tibial suspension.
- C 2.3.4 Fabrication of Trans Tibial prosthesis with High Density
- C 2.3.5 Polyethylene Endoskeleton Trans Tibial prosthetic systems (Metallic-Demonstration only)
- 2.3.6 Fabrication of Trans Tibial Prosthesis using ICRC PP technology.
- 2.3.7 Biomechanics , gait analysis and checkout of Trans Tibial Prosthesis

C3. Module 5: Knee Disarticulation Prosthesis

C3.1 Description

In this unit the trainee learns the fabrication of knee disarticulation prostheses, different components of the prosthesis, use and fabrication of local knee joints, different biomechanical principles involved in the fabrication, alignment and gait training with the prosthesis.

C3.2 Objectives

At the end of the unit the trainee will be able to:

- C3.2.1 Prescribe the required prosthesis with appropriate component.
- C3.2.2 Explain the biomechanics of knee disarticulation prosthesis.
- C3.2.3 Explain the socket design as per the individual need of the user.
- C3.2.4 Demonstrate the different processes involved, component materials and tools required. During the fabrication of the prosthesis.
- C3.2.5 Demonstrate gait deviations and carry out the necessary alterations.
- C3.2.6 Carry out fabrication of local knee joint and repair of the prosthesis using local resources

C3.3 Contents

- C3.3.1 Socket designs (End weight bearing)
- C3.3.2 Fabrication of prosthetic knee joints
- C3.3.3 Conventional design laminated design
- C3.3.4 Biomechanics and gait analysis with Knee Disarticulation Prostheses

C4. Module 6: Trans Femoral Prosthesis

C4.1 Description

In this unit the trainee learns about the different designs and processes involved in the fabrication of the Trans Femoral socket and prosthesis. He/she also learn the biomechanics of the Trans Femoral prosthesis, alignment, check out and the gait analysis.

C4.2 Objectives

At the end of this unit the trainee will be able to:

- C4.2.1 Describe advantage, disadvantage, indication and contraindication of Trans Femoral socket design, Knee joints and its suspension.
- C4.2.2 Prescribe the required prosthesis with appropriate component
- C4.3 Demonstrate the use of materials and specific tools and fabricate the following designs of Trans Femoral prosthetic sockets
 - C4.3.1 Quadrilateral Socket
 - C4.3.2 Ischial containment socket
- C4.4 Fabricate the following:
 - C4.4.1 Conventional Trans Femoral Prosthesis with local components-
 - C4.4.2 Trans Femoral prosthesis using ICRC components.
- C4.5 Demonstrate other endoskeleton components.
- C4.6 Describe biomechanics and carry out gait analysis of Trans Femoral prosthesis

C4.7 Contents

- C4.7.1 Different types of socket design –Quadrilateral socket & Ischial containment socket,
- C4.7.2 Different types of prosthetic knee joints & suspension.,
- C4.7.3 Conventional Trans Femoral Prosthesis with local components.
- C4.7.4 Endoskeleton Trans Femoral prosthesis with ICRC PP technology.
- C4.7.5 Demonstration of other endoskeleton components.
- C4.7.6 Biomechanics and gait analysis with above knee prosthesis

RECOMMENDED BOOKS:

1. Prosthetics and Orthotics Practice:
 - Douglas G. Smith, John W. Micheal, John H. Bowker - Atlas of Amputations and Limb Deficiencies
 - Surgical, Prosthetic and Rehabilitation Principal.
 - Bertram Goldberg, John D. Hsu, Atlas of Orthoses and Assistive Devices.
 - G. Fitzlaff, S. Heim. Lower Limb prosthetic components, Design, Function and Biomechanical Properties, Dortmund, Verlag Orthopaedic Technik, 2002, 131P
 - S. Heim, Practical Manual Part I. II, III, Germany, GTZ, 1983
 - Prosthetics and Orthotics International, The Journal of the International Society of Prosthetics and Orthotics