NORTHERN TECHNICAL UNIVERSITY

Mosul Polytechnic College — Department of Prosthetics and Orthotics Techniques — Course Syllabus (Academic Year 2025–2026)

1. COURSE GENERAL INFORMATION

Course Title	Lower Limb Prosthetics & Biomechanics	**Course Code**	POT-312
Academic Year	2025–2026	**Semester / Level**	Semester 1 / Year 3
Credit Hours	4 Credits (2 Theory / 4 Lab)	**Department**	Prosthetics & Orthotics Tech.
College	Mosul Polytechnic College	**University**	Northern Technical University

2. COURSE DESCRIPTION & OBJECTIVES

This course provides students with comprehensive technical and theoretical knowledge regarding lower limb prosthetic design, biomechanical analysis, alignment principles, and clinical fitting techniques. Emphasizing hands-on laboratory practice, students learn plaster casting, socket modification, component selection, and gait analysis for trans-tibial and trans-femoral amputees.

Key Learning Objectives:

- Understand the anatomical and biomechanical considerations in lower limb amputation and prosthetic management.
- Master plaster impression, negative mold modification, and socket fabrication techniques.
- Perform static and dynamic alignment of trans-tibial and trans-femoral prosthetic systems.
- Conduct comprehensive clinical gait evaluations and troubleshoot gait deviations.

3. WEEKLY COURSE OUTLINE

WEEK	THEORETICAL TOPICS	PRACTICAL / LABORATORY WORK	ASSESSMENT
Week 1	Introduction to Lower Limb Prosthetics & History	Patient Assessment & Clinical Documentation	Quiz 1
Week 2	Trans-tibial Biomechanics & Socket Designs (PTB, TSB)	Anatomical Landmark Identification & Measurement	Lab Report
Week 3	Plaster Impression Techniques for Trans-tibial Prostheses	Negative Mold Casting (Hands-on Practice)	Practical Evaluation
Week 4	Positive Model Rectification & Socket Pressure Distribution	Plaster Rectification & Modification	Lab Check
Week 5		Vacuum Forming Check Sockets	Quiz 2

WEEK	THEORETICAL TOPICS	PRACTICAL / LABORATORY WORK	ASSESSMENT
	Diagnostic Check Socket Fabrication & Thermoforming		
Week 6	Prosthetic Feet & Ankle Mechanisms Classification	Component Assembly & Static Alignment Setup	Assignment 1
Week 7	Midterm Theoretical Examination	Midterm Practical Examination	**Midterm Exam**
Week 8	Trans-femoral Biomechanics & Ischial Containment Sockets	Trans-femoral Measurement & Casting Techniques	Lab Report
Week 9	Trans-femoral Rectification & Axis Alignment Principles	Plaster Model Rectification for Trans-femoral Socket	Lab Check
Week 10	Prosthetic Knee Units: Single-Axis to Polycentric Mechanisms	Knee Component Setup & Bench Alignment	**Quiz 3**
Week 11	Suspension Systems (Suction, Pin-Lock, Vacuum, Harness)	Fitting & Suspension Customization	Practical Evaluation
Week 12	Normal vs. Pathological Gait Analysis in Amputees	Dynamic Gait Observation & Troubleshooting	Case Study
Week 13	Advanced Materials: Carbon Fiber Laminations & CAD/CAM	Lamination Techniques & Resins Handling	Lab Report
Week 14	Clinical Practice & Patient Fitting Procedures	Full Assembly, Final Delivery & Patient Education	Final Lab Exam
Week 15	Course Review & Final Comprehensive Assessment	Final Project Presentation	**Final Exam**

4. GRADING POLICY & EVALUATION BREAKDOWN

Assessment Component	Weight / Percentage	Description
Midterm Theoretical Exam	20%	Written exam covering weeks 1 to 6 theory topics.
Midterm Practical Exam	15%	Laboratory evaluation on casting and socket rectification.
Quizzes & Assignments	10%	Periodic quizzes and laboratory technical reports.
Practical Lab Performance & Attendance	15%	Ongoing assessment of workshop safety, skill execution, and attendance.
Final Theoretical Exam	25%	Comprehensive end-of-semester written examination.
Final Practical / Clinical Exam	15%	Final socket fabrication, fitting evaluation, and gait analysis exam.