

Training module

Robotic rehabilitation

Module Description

This module provides healthcare professionals and rehabilitation staff with core theoretical knowledge and practical skills necessary for competent integration and use of robotic rehabilitation devices in clinical settings. Participants will gain experience in patient assessment, safe device operation, individualized therapy planning, and interdisciplinary teamwork using the latest robotic and sensor technologies.

Academic Contents

- Overview of Robotic Rehabilitation: Evolution, key concepts, and patient population.
- Types of Robotic Systems: Exoskeletons, robotic arms, wearable devices.
- Human–Robot Interaction (HRI): Principles, communication, and therapeutic applications.
- Sensor Technologies: Kinect, IMU sensors, EMG interfaces for movement detection.
- Operative Modules: Human Motion Perception, Human–Computer Interaction, Interactive Scenes.
- Clinical Implementation: Therapy protocols, personalized patient approaches.
- Evaluation and Outcome Measures
- Ethical and Social Considerations: Accessibility, patient autonomy, barriers to adoption.
- Documentation and Communication
- Recording robotic session findings and sensor data
- Explaining results and progress to patients and caregivers
- Inter-professional feedback and discussion
- Common Pathologies and Indications: Stroke, cerebral palsy, spinal cord injury, musculoskeletal disorders, post-surgical rehabilitation

Learning Outcomes

By the end of this module, participants will be able to:

- Describe main robotic systems used in rehabilitation and their clinical applications.
- Prepare both patient and device for safe, effective robotic intervention.
- Perform a systematic robotic rehabilitation session, including setup, calibration, and interactive therapy
- Identify and interpret clinical and technical signs relevant to robotic rehabilitation
- Communicate effectively with patients before, during, and after robotic interventions
- Document session findings, device operation, and patient progress clearly
- Assess therapy outcomes and patient safety during robotic sessions
- Discuss challenges, limitations, and future directions in robotic rehabilitation.

Teaching Aids

- PowerPoint slides explaining key concepts and technical details.
- Real or virtual demonstrations of robotic systems (Kinect, exoskeleton, robotic arms).
- Simulation software.
- Video case studies of robotic intervention in rehabilitation.
- Printed handouts, assessment forms (Fugl-Meyer, Motor Activity Log).
- Q&A session and group discussions.

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Two-Day Time Schedule

Day one

Day, Time	Topic/Activity	Teaching Aid	Duration
Day 1, 09:00	Introduction to Robotic Rehabilitation	Slides, handout	45 min
Day 1, 09:45	Human–Robot Interaction & Sensor Tech	Demo, simulation software	60 min
Day 1, 10:45	Break	—	15 min
Day 1, 11:00	Operative Modules Overview	Slides, videos	45 min
Day 1, 11:45	Clinical Implementation (protocols & personalization)	Videos, group discussion	45 min
Day 1, 12:30	Lunch Break	—	60 min
Day 1, 13:30	Hands-on: Robotic Devices & Sensor Setup	Lab equipment, simulation	90 min
Day 1, 15:00	Outcome Assessment Tools	Forms, interactive session	45 min
Day 1, 15:45	Q&A Panel and Recap	Discussion	45 min

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Day two

Day 2, 09:00	Modern Trends & Future Directions	Slides, papers	45 min
Day 2, 09:45	Ethical and Social Discussion	Case study, discussion	60 min
Day 2, 10:45	Break	—	15 min
Day 2, 11:00	Group Project – Therapy Plan Design	Group work, forms	90 min
Day 2, 12:30	Lunch Break	—	60 min
Day 2, 13:30	Project Presentations, Peer Evaluation	Presentations	90 min
Day 2, 15:00	Final Assessment & Feedback	Quiz, feedback forms	45 min
Day 2, 15:45	Closure & Certificates	—	15 min

Final remarks and future contact and feedback, certificates.

Venue and delivery mode: Qimam foundation KSB- MED Center halls

- Physical: Clinical skills center equipped with robots, anatomical models, and AV facilities.
- Online: Virtual classroom with video demonstrations, interactive case discussions.

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