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TEMPUS PROJECT

HUman-**TO**ol interaction **N**etwork

**Development of laboratory facilities
supporting the new curriculum**



HUTON PROJECT / DEVELOPMENT OF THE CURRICULUM: MECHATRONICS FOR REHABILITATION

PROJECT SUMMARY

The HUTON is developing the interdisciplinary and multidisciplinary curriculum and the training network for the optimized use of technology that improves the quality of life of humans with special needs with the following specific objectives:

- **Development of the new interdisciplinary and multidisciplinary accredited curriculum** leading to the **master degree** in the domain of technologies for humans with special needs.
- Setup of the **training network in Republic of Serbia** in the domain of **mechatronics, rehabilitation engineering and medicine, and neurorehabilitation** that enables the delivery of the new interdisciplinary and multidisciplinary curriculum.
- **Training of staff** for providing **on-the-job education and new employment opportunities**; hence providing better medical services for humans with special needs.

Specific Project Objectives:

1. New accredited interdisciplinary and multidisciplinary curriculum in the field of new technologies for assisting humans with special needs.
2. The network that supports the new curriculum.
3. Training of staff for providing on-the-job education and new employment opportunities



Goals

1. Development of the laboratories at three university partner sites
 - Measurement equipment
 - Mechatronic systems for educational purposes

2. Instrumentation for improved rehabilitation at three clinical partner sites
 - Training of the medical staff
 - On site education of the students following the new curriculum
 - Delivery of services (therapy)

WP2: Design of new courses and restructuring of existing courses with supporting teaching materials

DELIVERABLES:

2.1	Review of existing syllabi (EU and Serbian UNI)
2.2	New and restructured syllabi for all courses
2.3	Prepared and printed teaching materials
2.4	Lab and supporting staff training

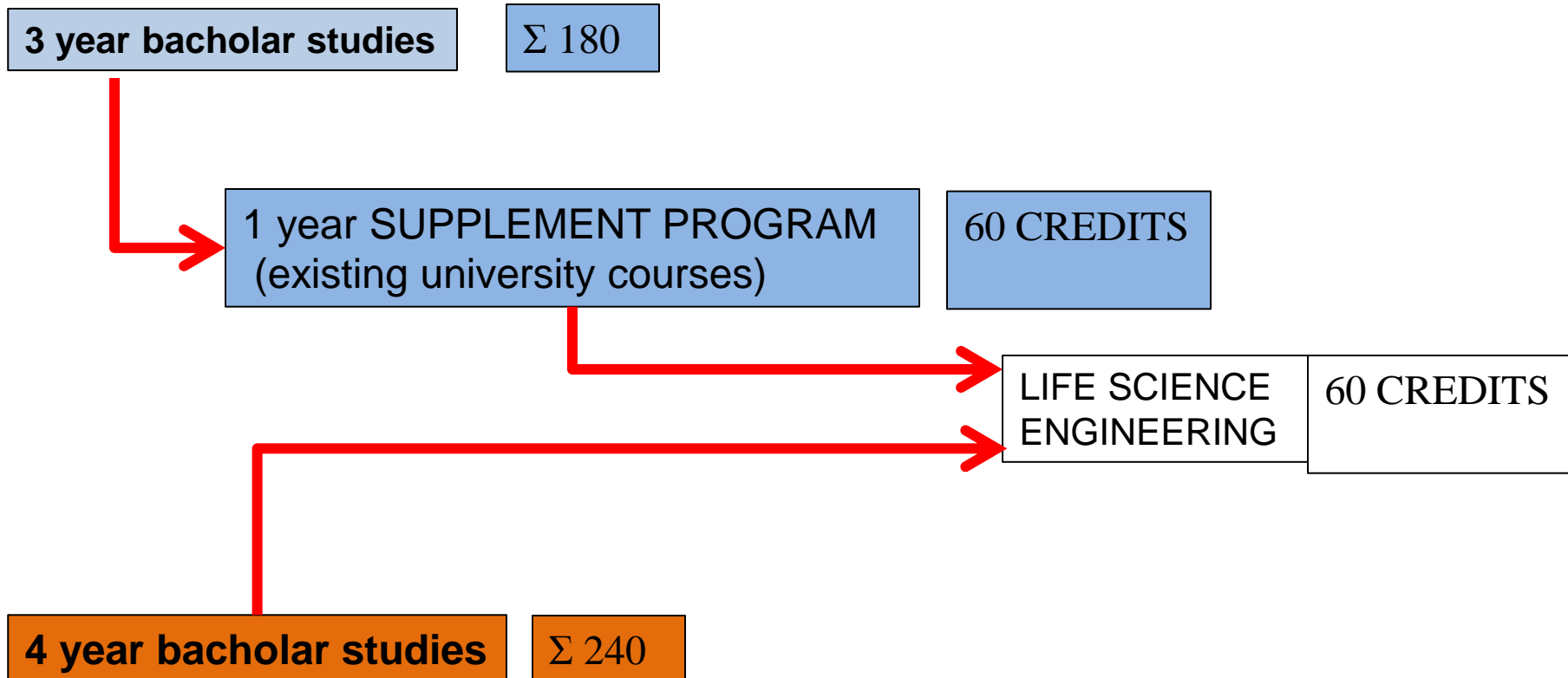
Curriculum

ACADEMIC LEVEL: MASTER OF SCIENCE

STUDENTS BACKGROUND	ENGINEERING	LIFE SCIENCE
VOCATION	LIFE SCIENCE ENGINEERS	

Curriculum

Entering level



Credit structure for the MS degree:

- core courses	$4 \times 6 = 24$
- elective courses*	$3 \times 6 = 18$
- master thesis	$18 = 18$
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TOTAL	60

*at least 2 (out of 3) elective courses must be from the curriculum of the student's original educational background



HUTON program objectives:

*Engineering background students

- understanding of technical requirements, ability to design and integrate mechatronics into the rehabilitation practice

*Life science background students

- understanding of assistive devices and their potentials, recognition of human needs after the onset of disability, ability to select the appropriate and effective mechatronic system for rehabilitation

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Core program

	SUBJECT	LECTURER	UNIVERSITY
1	CONTROL OF BIOLOGICAL ACTUATORS	Prof. Nikola Jorgovanović	Novi Sad
2	CONTROL OF MOVEMENT	Prof. Dejan Popović	Belgrade
3	MECHATRONIC SYSTEMS	Prof. Aleksandar Veg	Belgrade
4	SIGNALS AND SYSTEMS IN REHABILITATION	Assist. Prof. Lana Popović Maneski	Novi Pazar

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Engineering courses - sensors, controls, drives

	COURSE TITLE	PERSON RESPONSIBLE	UNIVERSITY
1	MECHANICS OF ROBOTS	Prof. Branislav Borovac	Novi Sad
2	CONTROL FOR MAN-MACHINE SYSTEMS	Assist. Prof. Tomislav Šekara	Belgrade
3	PNEUMATIC AND HYDRAULIC ACTUATORS	Prof. Ljubomir Miladinović	Belgrade
4	ELECTRICAL AND MAGNETIC ACTUATORS	Prof. Stevan Stankovski	Novi Sad
5	SENSORS FOR MECHATRONIC SYSTEMS	Assist. Prof. Tomislav Šekara	Belgrade
6	BIOLOGICAL SIGNAL PROCESSING FOR REHABILITATION	Assist. Prof. Lana Popović Maneski	Novi Pazar
7	MICROCOMPUTERS	Prof. Nikola Jorgovanović	Novi Sad

HUTON CURRICULUM

Life science courses - rehabilitation

	SUBJECT	LECTURER	UNIVERSITY
1	BIO STATISTICS	TO BE DECIDED	Novi Sad
2	RESEARCH METHODS IN REHABILITATION AND ETHICS	Prof. Ljubica Konstantinović	Belgrade
3	DISABILITY AND REHABILITATION	Prof. Laslo Švrtlih	Novi Pazar
4	ROBOTICS FOR REABILITATION	Prof. Dejan Popović	Belgrade



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Review of existing equipment at clinical partner sites

CR BEG

Conventional electro, hydro and occupational therapy, functional electrical stimulation, gaming, workaround

CYHCI NS

Conventional therapy systems for children

SH NP

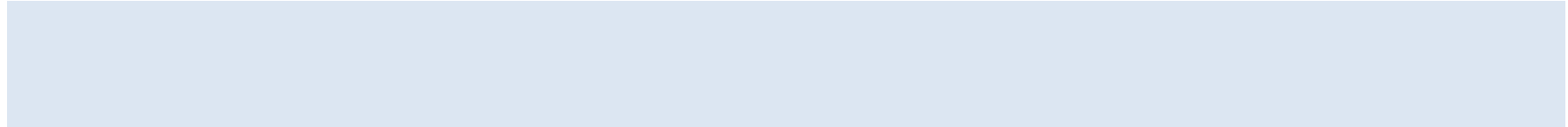
Conventional electro, hydro and occupational therapy



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Clinical
partners

Multi-channel stimulator for FET, body posture assistive device, gaming system for arm and hand exercise, movement assessment system and biofeedback

Universities

Data acquisition systems (EMG/EEG)
Measurement equipment



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Multi-channel stimulator for FET



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ROBOTIC ASSISTANT FOR UPPER EXTREMITIES EXERCISE/TRAINING

The robot assistant for upper extremities is a workstation for clinical use. The workstation allows a range of exercise games with adjustable difficulty levels and a standardized hand and arm function tests.

Body posture assistive device





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Gaming system for arm and hand exercise





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Movement assessment system





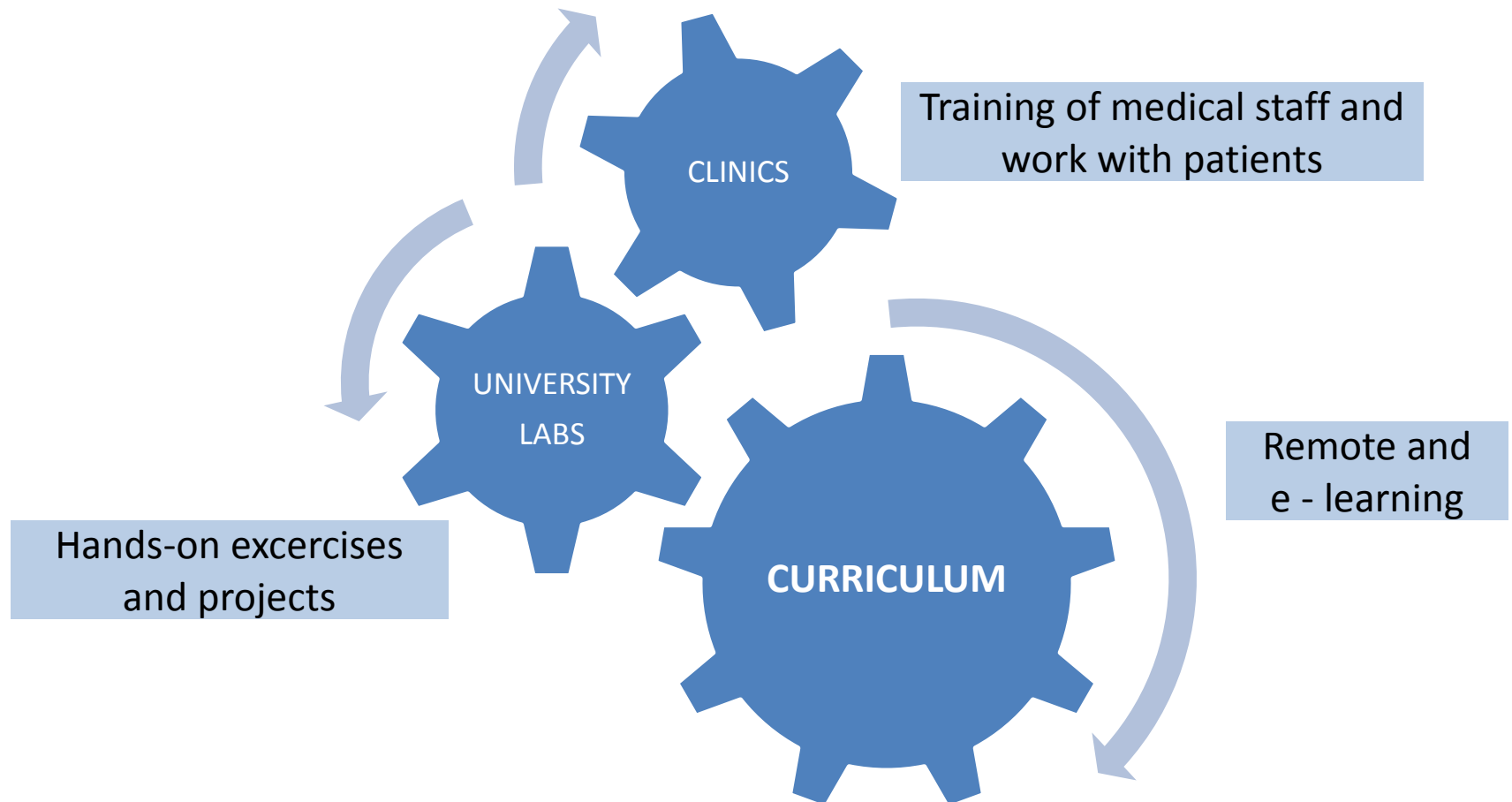
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Biofeedback



Why this laboratory equipment?





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Thank You