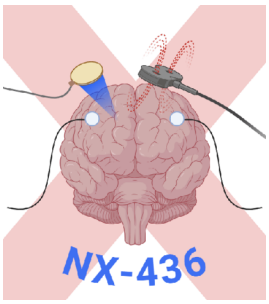

Nx-436: Lecture Topics, lecturer:

Week	Lecturer	Topic
Week1	FH	Introduction in the course (Organization, Requirements, Lectures-Exercises, Evaluation, Grading) Introduction into Neuromodulation. History of Neuromodulation
Week2	FH	Neuromodulation of the vegetative system: Vagal nerve stimulation (VNS)
Week3	FH	Neuromodulation of the peripheral nerve stimulation
Week4	ER	Focused ultrasound neuromodulation
Week5	FH	Spinal cord stimulation (invasive, non-invasive)
Week6	FH	Transcranial magnetic stimulation (TMS) I (to determine brain functioning)
Week7		no lecture
Week8	FH	Transcranial magnetic stimulation (TMS) II (neuromodulation)
Week9	FH	Transcranial electric stimulation (tES) I
Week10	FH	Transcranial electric stimulation (tES) II
Week11	VZ	Neuromodulation by optogenetics/chemogenetics
Week12	MR	Deep brain stimulation (DBS) I: invasive
Week13	FH	Deep brain stimulation (DBS) II: non-invasive
Week14	FH	NIBS and multimodal imaging
Week15	FH	Future outlook for neuromodulation: home-based, closed loop etc.

Learning Goals

- Brief overview about the history of brain stimulation
- Know the current methods for neuromodulation (non-invasive and invasive)
- Know the technological background, mechanisms of actions of them
- Know safety and regulatory aspects of them
- Know the challenges, limitations of these technologies that have to be addressed
- Know about non-personalized vs personalized neuromodulation, heterogeneity of response and how to address this
- Know the concept of state-dependent, closed-loop neuromodulation, challenges and opportunities
- Know the use of machine learning, AI for neuromodulation.
- Know about clinical applications, challenges and opportunities
- Know about home-based self-application, technological requirements, challenges, opportunity.

Lecturer

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