Modulbezeichnung:	**Digital Health (Digital Health)** (Digital Health)	**5 ECTS**
Modulverantwortliche/r:	Oliver Amft	
Lehrende:	Luis Ignacio Lopera Gonzalez, Oliver Amft	

Startsemester: WS 2021/2022	Dauer: 1 Semester	Turnus: jährlich (WS)
Präsenzzeit: 60 Std.	Eigenstudium: 90 Std.	Sprache: Englisch

Lehrveranstaltungen:

WPF-DS-MA ab 1. FS

Digital Health (WS 2021/2022, Vorlesung mit Übung, 4 SWS, Anwesenheitspflicht, Oliver Amft et al.)

Inhalt:

Digital health is a branch of digital medicine that integrates and leverages multisource and multimodal data for medical knowledge extraction and decision support across a wide range of preventive, diagnostic, and therapeutic applications. The course starts by introducing the basic properties of medically relevant data sources and their different modalities. The course introduces the medical benefits of using ubiquitous technologies for data collection, in particular, between hospital visits. The process of medical data integration in clinical information systems and in digital health applications ("Digitale Gesundheitsanwendungen", DGA) is discussed. The German DGA regulations and their consequences are introduced, in particular relating to digital health application qualification and data privacy. Privacy preserving techniques are discussed and applied. Subsequently, data interpretation in telemedicine and digital biomarker design are analysed regarding context recognition and personalisation methods and algorithms. Decision support systems are dissected regarding their components and data analysis algorithms. Finally, the concept, realisation, and application of digital health twins in medicine is developed. The exercises will include practical experiments and implementation tasks, e.g. smartphone apps, 3D digital twin modelling, and data analysis for decision support.

Lernziele und Kompetenzen:

Learning goals and competences:

- Understand the data sources and modalities in digital medicine.
- Understand the German DGA regulation and issues relating to data privacy.
- Understand the processes of data integration in clinical information systems and DGAs.
- Apply ubiquitous technology (ambient, mobile, wearable, implantable) for digital health.
- Apply context recognition and personalisation methods to qualify ubiquitous system data.
- Apply data-based privacy preserving techniques (obfuscation) in DGAs (Smartphone apps).
- Design and implement digital biomarkers based on multimodal data.
- Design and apply digital health twins.
- Design medical decision support systems based on multimodal data.

Literatur:

Up-to-date literature recommendations are provided during the lectures.

Verwendbarkeit des Moduls / Einpassung in den Musterstudienplan:

Das Modul ist im Kontext der folgenden Studienfächer/Vertiefungsrichtungen verwendbar:

[1] **Data Science (Master of Science)**

(Po-Vers. 2021w | Gesamtkonto | Anwendungsfach | Medical Data Science | Digital Health)

Dieses Modul ist daneben auch in den Studienfächern "Medizintechnik (Master of Science)" verwendbar.

Studien-/Prüfungsleistungen:

Digital Health (Prüfungsnummer: 68341)

Prüfungsleistung, elektronische Prüfung, Dauer (in Minuten): 60

Anteil an der Berechnung der Modulnote: 100%

weitere Erläuterungen:

Abgabe von Berichten zu allen Übungsaufgaben ist Voraussetzung für die Zulassung zur Prüfung.

Submitting all exercise reports is compulsory to be accepted for the exam.
Prüfungssprache: Englisch

Erstablegung: WS 2021/2022, 1. Wdh.: SS 2022
1. Prüfer: Oliver Amft

Bemerkungen:
Online via Zoom and videos via StudOn. Grading: e-exam in written form (online, 60 min).