Course Package

Personalized monitoring and Coaching – 1B

Name module	Personalized monitoring and Coaching – 1B
Educational programme	MSc Health Sciences
Period	Second block of the first semester (block 1B)
Study load	15 ECTS (3 x 5 EC)
Coordinator	A.H Prins

Personalized monitoring and Coaching			
block 1A	**block 1B**	**block 2A**	**block 2B**
	eHealth Development: A Holistic Approach 201600027 (5 EC)		
	eHealth Technology 202200149 (5 EC)		
	Monitoring & Persuasive Coaching 201600029 (5 EC)		

Required preliminary knowledge: Basic knowledge of Excel.

201600027 - **eHealth Development: A Holistic Approach**

The main objective of healthcare is to provide the best possible care that meets the needs of patients. However, due to declines in birth rates and longer life expectancies, the number and proportion of elderly people in our developed society is growing. At the same time, fewer working-age adults are available to support and care for the increasing number of (chronically) ill people. Consequently, preserving high standards of patient-centered care is a challenge, which may require an increased focus on important matters such as self-management. Besides these problems, there is a need to further improve the healthcare system and provide personalized treatment that optimally fits the characteristics, needs and daily lives of an increasingly digitalized population. eHealth technologies are seen as a solution to the above-mentioned changes in healthcare. eHealth refers to the use of information and communication technologies to support health, well-being and healthcare. It is a term that captures interrelated concepts about the health context, technology, and people.

In this master course we will provide you with insights into the domain of eHealth. You will be introduced to concepts of user-friendly, value driven and persuasive eHealth technologies and their holistic development, implementation and evaluation processes.

If you are enrolled in the Personalized Monitoring & Coaching track, the acquired knowledge will also be useful for the other two master courses. The course consists of eight interactive lectures. In order to benefit from these lectures, we expect you to come to class prepared, meaning that you have read the required literature and completed the preparatory assignment of that week before class.

The modules are tentative and subject to change. Please check the website *regularly*

202200149 - **eHealth Technology for Remote Patient Monitoring and Decision - making**

In Telemedicine we study theories, approaches and systems that focus on treating and assisting people in managing chronic health conditions or lifestyle changes in their own daily environment thereby supported by health care professionals when needed (Telemedicine or eHealth). To understand these systems, analyze them and to design them, we need to understand the health issues and problems that have to be addressed by the telemedicine system and we need to understand what the suitable building blocks and architectures are to design these systems. Furthermore, we need to be able to evaluate the system and understand how they can be implemented in everyday care practice.

Both elderly and people with chronic diseases are more viable to become victim of all kind of complaints and with the consequence of having problems with finding a balance between work and private life. Not only the number of patients seeking help for their health problems is increasing, but the health problems they report are also more complex. The number of people with chronic diseases is growing and almost half of them have multiple complex chronic conditions (multimorbidity). Complex chronic conditions pose a challenge for healthcare as it heavily impacts a person's quality of life physically, mentally and socially. Also, it consequently imposes a high burden on the healthcare system in terms of the complexity of treatment and care delivery, manpower and costs, because of the need of receiving complex and long-term care from multiple healthcare professionals. Since health, work and well-being are closely and powerfully linked, they need to be addressed together. As a consequence, in many cases the conventional 'one size fits all' treatment approach is no longer sufficient, and a more personalized approach is needed.

Current disease management and monitoring of patients with a complex chronic condition(s) now relies heavily on information acquired during time-based scheduled visits when patients are usually stable, whereas the actual symptoms and changes during common daily life triggers are not quantified. Follow-up of relevant physiological parameters at home (telemonitoring) can provide important quantitative insights into the severity and dynamics of a chronic disease. Next, the data will be analysed and interpreted to create targeted treatment via e.g. clinical decision-support systems. Benefits are expected to arise from earlier initiation of appropriate treatment resulting in less severe complications, accelerated recovery, and reduced healthcare utilization. In addition, telemonitoring can assist patients in their self-care behaviour and can be used to develop personalized coaching and feedback for the individual person. Especially supporting people in having a healthy lifestyle is important as for example a sedentary lifestyle is one of the main risk factors for all kind of health problems such as cardiovascular diseases, COPD, diabetes and musculoskeletal problems and because of the existing evidence that being active contributes positively to feeling healthy and quality of life. Although people do recognize the need for a more healthy lifestyle, they often find it difficult to get started and/or to stay motivated. Technology-supported lifestyle applications, focusing at physical activity, stress and nutrition, are expected to help people to continue contributing to society, the marketplace and the economy.

As such there is an ongoing development of patient monitoring and treatment outside the hospital using telemonitoring and telemedicine technology, using analysis and interpretation of data from existing and novel sensing methods in the wider clinical and daily life context. Such a telemedicine system can be decomposed into four main functional building blocks

1. Monitoring – this part of the system takes care of sensing relevant (health-related) parameters and whenever needed environmental parameters. It will often include some data processing so as to remove measurement artifacts or to extract basic features from the sensor data. Monitoring may also include the transfer of data to some local or remote data-store facility, and it may include presentation of the (raw) data.

2. Data Analysis – this part of the system takes care of analysing and interpreting the data with respect to biomedical or clinical metrics, or to estimate the state (either physical or mental) of the data.

3. Decision Support – In decision support the outcomes of the analysis are used to make decisions on whether or not action should be undertaken and which action. The question here is how we can derive and construct decision models and how should these be used.

4. Feedback and Coaching – Once a decision has been made, proper feedback and coaching to the user is needed in order to effectuate the action and/or move the user into the desired direction.

This course is about the design and development of an end-to-end telemedicine system for remote monitoring and coaching by addressing these four different building blocks, to enable personalized intervention of the complex chronic condition, focusing on long-term care and healthy lifestyle (nutrition, physical activity).

201600029 - **Monitoring & Persuasive Coaching**

Through the digitalization of society, a boundless amount of personal data becomes available, e.g. on a person's physiological state, their location, or their subjective well-being. Technology has the potential to translate these data into meaningful information that can be used to improve health andwell-beingg: data can be used to monitor behavior and to coach people in improving their unhealthy or undesired behavior. On top of that, data is of added value in the development, implementation and evaluation of technologies that can increase health,well-beingg or healthcare.

During this course we will focus on the use of data and technology for monitoring and coaching purposes in order to improve health andwell-beingg on an individual level. You will learn about the meaning of and relationship between monitoring, coaching, health, data and technology development. You will also gain on-hand experience with these concepts by completing three different projects, based on ongoing research projects. The topics of these projects are:

1. Collecting quantitative and qualitative data to learn more about a health problem and possibilities for improvement;
2. Developing a prototype of a persuasive monitoring and coaching technology based on an analysis of behavior;
3. Analyzing log data to assess and improve adherence to technology.