# Vak: Medical Instrumentation — credits: 5

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| **Vakcode** | ELVH18GMI |
| **Naam** | Medical Instrumentation |
| **Studiejaar** | 2024-2025 |
| **ECTS credits** | 5 |
| **Taal** | Engels |
| **Coördinator** | J. Zijlstra |
| **Werkvormen** | Hoorcollege<br>Practicum / Training |
| **Toetsen** | Medical Instrumentation - Schriftelijk, organisatie ToetsCentrum |

**Leeruitkomsten**

The student:

- understands Bioelectric signals (origin of biopotentials, biopotential electrode designs, biopotential amplifier circuits,signal characteristics: electrocardiogram, electroencephalogram, electromyogram, electrooculogram,lead systems, artifacts);
- understands blood pressure, flow and volume, Cardiac output (direct and indirect blood pressure measurement, Fick principle, dilution, plethysmography, Ultrasonography);
- understands physics of MRI, X-ray and CT imaging modalities;
- understands Respiration (model of the respiratory system, gas concentration, lung volume, spirometry);
- understands physics of Implantable devices (pacemaker, defibrillator);
- knows Biochemical sensors (for blood-gas and acid-based physiology);
- has knowledge of safety aspects and regulatory affairs of medical devices IEC 601;
- is able to translate medical demands in technical solutions;
- understands the basic principles of Switched Mode Power Supplies (Buck/Boost);
- understand and applies principles of Digital Signal Processing (DSP); like laplace transform, Z-transform, IIR filters, low/hi-pass, bandpass notch filters and the Fourier series and DFT.

**Inhoud**

To develop an understanding of the measurement principles of medical instrumentation, including biochemical sensors, bio-potential amplifiers, bioelectrical signals (ECG, EEG), measurement of respiratory function, cardiac variables, blood pressure, blood flow as well as medical devices and signal analysis.

**Opgenomen in opleiding(en)**

Exchange Biomedical Engineering (autumn)
Minor Biomedical Engineering

**School(s)**

Instituut voor Engineering

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