Physics and Physiology behind Medical Technology

<table>
<thead>
<tr>
<th>Title Post-Master Class</th>
<th>Physics and Physiology behind Medical Technology</th>
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<td>Number of daily periods: (à 4 hours)</td>
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<tr>
<td>10</td>
<td>Other (selfstudy, paper/assignment preparation, preparing for exam if applicable)</td>
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<td>10</td>
<td>Examination (paper presentation day/ exam day)</td>
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<td>3 ECTS (1 ECTS = 28 hours)</td>
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<td>Medical physicists in training, biomedical engineers and other technology professionals (in training) working in healthcare (hospitals and medical industry).</td>
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Short description
Medical physicists, biomedical engineers and healthcare equipment development engineers must have an overview of the medical equipment typically used in a hospital and understand the underlying (bio-)physics and technology, the basic post-processing techniques and understand how and why technology is applied. This course provides the student with an understanding of the physical principles of measurement and monitoring of vital functions in clinical practice and the current technological developments.

Learning goals
1. The participant understands the commonly used medical technology in hospitals (excluding medical imaging for which other courses are available).
2. The participant understands the impact of the used technology and why it is used.
3. The participant understands the basics of biophysics of physiology and pathology.
4. The participant understands the physics typically used in medical technology.
5. The participant learns to explain new technology used in hospitals in a for physicians understandable way.
6. The participant learns to present a technical advice for a hospital concerning new technology.
7. The participant learns to address safety issues and risks.

Content
Block 1 (3 days + 1 review day):
- Introduction and basics of biophysics and transducers.
- Heart & Circulation: ECG monitoring, advanced analysis, defibrillators and pacemakers, blood pressure monitoring and optical monitoring techniques. Clinical application of patient monitoring ICU/OR.
- Nervous system: EEG monitoring and advanced neuromonitoring.
- Digestive system: endoscopy technology.
- Drug delivery technology (infusion pumps, anesthesia).

Block 2 (2 days + 1 review day):
- The lungs: respiration monitoring and ventilation therapy.
- Excretory system (focusing on dialysis).
- Cutting techniques (electrosurgery, ablation, laser).
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Cutting edge technology for all equipment explained throughout the course. Note that if you take the complete course 1+2 that it will only be 1 feedback & review day at the end.

Format

- 5 interactive course days + 1 feedback & review day.
- 2 days “at location in a hospital”: at least 1 day UMCU (Utrecht) and 1 day MMC (Veldhoven)
- Assignment for writing an essay.
- Essay presentation and final discussion during the feedback & review day.

Language post-master class

- Oral: English (only if foreign participants are present, otherwise in Dutch)
- Written: English (hand-outs, literature).

Course material (and literature)

- Hand-outs, provided by SMPE/e.
- Teachers’ presentations made available by SMPE/e.
- Recommended literature (but not obligatory):
  "Handbook of Medical Technology - edited by Kramme, Rüdiger; Hoffmann, Klaus-Peter; Pozos, Robert S. Springer 2011 (available at library TU Eindhoven).
- Regarding rights on material see SMPE/e course conditions.

Completion/Certification

- After registration, full attendance (100 %) is mandatory, unless otherwise agreed with SMPE/e. In case of force majeure, contact the SMPE/e office immediately.
- Participant obtained a sufficient mark for the paper/assignment.
- Furthermore see SMPE/e course conditions.

Registration

- Registration via link on www.tue.nl/smpee/cursussen
- Office SMPE/e-courses will send a confirmation by e-mail.
- Registration is possible until start date of a course (note: limited number of participants, FULL=FULL).
- Also see SMPE/e course conditions.

Course fee

Course fee:
- For the complete series (5 course days and 1 review day with presentations): € 1.700,-.
- For Block 1 (3 days + 1 review day with presentations) separately: €1.350,-.
- For Block 2 (2 days + 1 review day with presentations) separately € 950,-.
- Costs PhD students: € 450,- for full course, Block 1: € 360,-, Block 2: 250,-, € 100,- for a separate day.
- Invoice: the invoice will be sent by the office SMPE/e-courses to participants or institutions as indicated on the registration form.
- Also see SMPE/e course conditions.

Further Information
Physics and Physiology behind Medical Technology

- [www.tue.nl/smpee](http://www.tue.nl/smpee) [courses]
- Office SMPE/e courses: smpee@tue.nl (tel. 040 247 2134).