Master’s Degree Programme in BME / Lääketieteen tekniikan maisteriohjelma

Study Info event
August 31, 2020

Prof. Tapio Seppänen, Director of BME degree programme
Dr. Mikko Finnilä, Co-director of BME degree programme
Ms. Anna Maijala, Mr. Bijay Shakya, Ms. Tiina Seppänen
© Business Oulu, Oulu Innovation
Health Technology in Oulu Area

- Health technology is the largest, rapidly increasing high-tech industry in Finland
- Oulu is a world-wide known high-tech city
- Oulu is the second largest health technology industry region in the country
- OuluHealth forms an internationally significant regional ecosystem for health technology, including OuluHealth Labs
- Center for Health and Technology (CHT) is one of the innovation centers of the Oulu Innovation Alliance
Main fields of BME research at UO

Ambient Assisted Living
Biomaterials and Tissue Engineering
Biomechanics
Biomedical Measurements
Biosignal Analysis
Biophotonics
eHealth / mHealth
Medical Image Analysis
Medical Imaging
Medical Physics
Physical Activity Monitoring
Wireless Monitoring, BAN
Organization / Personnel of BME Degree Program
Master’s Programme in BME

Jointly organized by two faculties

- **Faculty of Medicine**
  - focus on biomechanics and biomaterials; medical physics and imaging; medical spectroscopy; medical informatics and artificial intelligence; and health technology applications

- **Faculty of Information Technology and Electrical Engineering**
  - focus on biomedical signal analysis; biomedical image analysis; machine vision; machine learning; pattern recognition; big data analytics; health technology applications
BME teaching is organized in two campus areas.

Linnanmaa campus

Kontinkangas campus
Key faculty members of BME DP

Dr. Mikko Finnilä
Degree program co-director
Faculty of Medicine

Mr. Bijay Shakya, MHSc
Tutor Teacher at FMed

Ms Anna Maijala, MHSc
PSP advisor at FMed
(Deputy for Anna since October: Eveliina Seppälä)

Prof. Tapio Seppänen
Degree program director
Faculty of Information Technology and Electrical Engineering
PSP advisor at ITEE

Ms. Tiina Seppänen, MSc (tech)
Tutor Teacher at ITEE

Dr. Anja Keskinarkaus,
Tutor Teacher at ITEE
Academic Affairs Service Team

General study affairs and study guidance including, eg.
- study rights
- annual registrations
- credit registrations
- graduation and preparation of degree diplomas
- open university

Service desks
- Faculty of Medicine study.medicine@oulu.fi
  - Location: Aapistie 7A, 2nd floor, room K201 (open Mon-Fri 10-14)

- Faculty of Information Technology and Electrical Engineering (ITEE) study.itee@oulu.fi
  - Location: Tietotalo, 1st floor, E-door (open Mon-Fri 10-14)

- Academic affairs' Compass Service Point opens service counters from 31.8.2020 on weekdays at 10-12.
  - If needed, you can also call service numbers (see below) on weekdays at 10-14:
  - Faculty of Information Technology and Electrical Engineering: Phone number +358 (0) 294 484022:
  - See: https://www.oulu.fi/forstudents/node/205186
Key Professors of BME courses

Prof. Tapio Seppänen
Biomedical Engineering

Prof. Timo Jämsä
Medical Technology

Prof. Miika Nieminen
Medical Physics

Prof. Simo Saarakkala
Biomedical Engineering

Prof. Jarmo Reponen
Health Information Systems

Prof. Mikko Tulppo
Physiology

Adj. Prof. Mikko Finnilä
Biomedical Engineering

Adj. Prof. Teemu Myllylä
Measurement Techniques

Adj. Prof. Jukka Kortelainen
Biomedical Signal Analysis and Applications

Adj. Prof. Lassi Rieppo
Biomedical Physics
Master’s Degree Programme in BME
Teaching of BME in University of Oulu

- University of Oulu (UO) has a long tradition (since 90’s) in the education and research in Biomedical Engineering (BME)

- Includes theoretical courses and hands-on projects to develop a good basis for experimental research

- The contributing departments have received excellent grades in international research assessments

- The programme structure and contents are based on the most recent international recommendations for BME education

- The education is interdisciplinary including information engineering, biomedical physics and medicine
Different study paths

**Master of Health Science (MHCs)**
Extent: 120 ECTS credits
Duration: 2 years
Language of instructions: English
Faculty: Medicine (FMed)

Field of specialization:
- Biomechanics and Imaging
- Health Technology

**Master of Science, Technology (MSc)**
Extent: 120 ECTS credits
Duration: 2 years
Language of instructions: English
Faculty: Information Technology and Electrical Engineering (ITEE)

Field of specialization:
- Signal and Image Processing
- Machine Learning and Big Data

**Terveystieteiden maisteri (TtM)**
Laajuus: 120 op
Opiskeluaika: 2 vuotta
Tiedekunta: Lääketieteellinen (LTK)

Suuntautuminen:
- Biomekaniikka ja lääketieteellinen kuvantaminen
- Terveysteknologia

**Diplomi-insinööri (DI)**
Laajuus: 120 op
Opiskeluaika: 2 vuotta
Tiedekunta: Tieto- ja sähkötekniikka (TST)

Suuntautuminen:
- Lääketieteellinen signaalin ja kuvankäsittely
- Koneoppiminen ja big data
Course Structure Diagram 2020-22
Master's Programme in BME
2 years, 120 credits

- 30 credits / semester
- 1 credit = 27 h of work

Possible bridge studies
Max 15 credits

Personal Study Plan (PSP)
adjusted by previous studies and personal interests

For international students only

Compulsory Courses 65 credits
Optional Studies 23-25 credits
Compulsory Finnish language studies 2 credits
Master's Thesis 30 credits
<table>
<thead>
<tr>
<th>Code and link to the course description in Oodi</th>
<th>Course name and ECST Credits</th>
<th>Preferred timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEE = Faculty of Information Technology and Electricity, students with Master of Science (Technology) as a target degree</td>
<td>BME Common Compulsory Studies 70-72 ECTS Credits</td>
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<td>FMED = Faculty of Medicine, students with Master of Health Sciences as a target degree</td>
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<td>521242A</td>
<td>Introduction to Biomedical Engineering, 5 ECTS cr</td>
<td>1P 2P 3P 4P 5P</td>
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<td>521148S</td>
<td>An Introduction to Computer Vision Methods for Biomedical Images, 5 ECTS cr</td>
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<td>521467A</td>
<td>OR alternatively for Finnish students: Digital Image Processing, 5 ECTS cr</td>
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<td>900017Y</td>
<td>Survival Finnish Course (for non-Finnish students only), 2 ECTS cr</td>
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<td>521123S</td>
<td>Biosignal Processing I, 5 ECTS cr</td>
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<td>041201A</td>
<td>Basics in eHealth, 5 ECTS cr</td>
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<td>080925A</td>
<td>Anatomy and Physiology for Biomedical Engineering, 5 ECTS cr</td>
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<td>521027S</td>
<td>Advanced Practical Training (ITEE) OR</td>
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<td>580121S</td>
<td>Practical Training (FMED), 5 ECTS cr</td>
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<td>521284S</td>
<td>Biomedical Engineering Project (ITEE) OR</td>
<td>5-10 ECTS cr</td>
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<td>580202S</td>
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<td>080928S</td>
<td>Biomedical Engineering Research Methods and Seminar, 5 ECTS Credits</td>
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<td>522987S</td>
<td>Master's Thesis in Biomedical Engineering (ITEE) OR</td>
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<td>580213S</td>
<td>Master's Thesis in Biomedical Engineering (FMED), 30 ECTS cr</td>
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<td>521000S</td>
<td>Computer Science and Engineering, The Maturity Test for Master's Degree (ITEE) OR Maturity Test (FMED), 0 ECTS cr</td>
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<td>Code and link to the course description in Oodi</td>
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<tr>
<td>ITIE = Faculty of Information Technology and Electricity, students with Master of Science [Technology] as a target degree</td>
<td>FMED = Faculty of Medicine, students with Master of Health Sciences as a target degree</td>
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<td><strong>BME Compulsory Studies of selected specialization 25 ECTS cr</strong></td>
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<td>Compulsory Studies of selected specialization for ITIE BME (Signal and Image Processing) 25 ECTS cr</td>
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<tr>
<td>5211495</td>
<td>Function and Analysis of Cardiovascular System, 5 ECTS cr</td>
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<tr>
<td>5212895</td>
<td>Machine Learning, 5 ECTS cr</td>
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<td>5214665</td>
<td>Machine Vision, 5 ECTS cr</td>
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<td>5212825</td>
<td>Biomedical Imaging II, 5 ECTS cr</td>
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<tr>
<td>5212858</td>
<td>Affective Computing, 5 ECTS cr</td>
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**Recommended Optional Studies for ITIE BME with specialization in Signal and Image Processing 23-25 ECTS cr**

<table>
<thead>
<tr>
<th>Code and link to the course description in Oodi</th>
<th>Course name and ECST Credits</th>
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<td>Towards Data Mining, 5 ECTS cr</td>
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<td>Introduction to Optimization, 5 ECTS cr</td>
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<td>5213485</td>
<td>Statistical Signal Processing, 5 ECTS cr</td>
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<td>Signal Processing Systems, 5 ECTS cr</td>
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<td>Multi-Modal Data Fusion, 5 ECTS cr</td>
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<td>0809205</td>
<td>Diagnostic Imaging, 5 ECTS cr</td>
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<td>Artificial Intelligence, 5 ECTS cr</td>
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<td>Multiprocessor Programming, 5 ECTS cr</td>
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<td>5210935</td>
<td>Biomedical Instrumentation, 5 ECTS cr</td>
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<td>080926A</td>
<td>Introduction to Biomedical Imaging Methods, 1-3 ECTS cr</td>
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<td>5211405</td>
<td>Computer Graphics, 5 ECTS cr</td>
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<td>5212835</td>
<td>Big Data Processing and Applications, 5 ECTS cr</td>
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<td>Course Name and ECST Credits</td>
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<td>Compulsory Studies of selected specialization option I for FMED BME (Biomechanics and Imaging) 25 ECTS cr</td>
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<td>Tissue Biomechanics, 5 ECTS cr</td>
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<td>Diagnostic Imaging, 5 ECTS cr</td>
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<td>080924S</td>
<td>Biomaterials, 5 ECTS cr</td>
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<td>080921S</td>
<td>Biomechanics of Human Movement, 5 ECTS cr</td>
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<td>080922S</td>
<td>Microscopy and Spectroscopic Imaging, 5 ECTS cr</td>
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<td>Recommended Optional Studies for FMED BME with specialization in Biomechanics and Imaging 23-25 ECTS cr</td>
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<td>Towards Data Mining, 5 ECTS cr</td>
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<td>NMR Imaging, 10 ECTS cr</td>
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<td>521405S</td>
<td>Biophotonics and Biomedical Optics, 5 ECTS cr</td>
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<td>521153S</td>
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<td>Biomedical Ultrasound, 5 ECTS cr</td>
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<td>080926A</td>
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<td>080923S</td>
<td>Physics in Radiation Therapy, 5 ECTS cr</td>
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<td>080917S</td>
<td>Project in Biomedical Technology OR</td>
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<td>080918S</td>
<td>Project in Medical Imaging, 5-10 ECTS cr</td>
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<td>Code and link to the course description in Oodi</td>
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<td>521097S</td>
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<td>Biomechanics of Human Movement, 5 ECTS cr</td>
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<td>Connected Health and mHealth, 5 ECTS cr</td>
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<td>Recommended Optional Studies for FMED BME with specialization in Health Technology 23-25 ECTS cr</td>
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<td>521124S</td>
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<td>521092A</td>
<td>Electronic Measurement Techniques, 5 ECTS cr</td>
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<td>Biomedical Processing II, 5 ECTS cr</td>
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<td>521283S</td>
<td>Big Data Processing and Applications, 5 ECTS cr</td>
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<td>080919S</td>
<td>Project in Health Technology, 5-10 ECTS cr</td>
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</table>
Personal Study Plan (PSP) (HOPS)

- Each new student has to create his/her own electronical PSP (in Finnish: HOPS) in WebOodi.
- Training how to use the PSP tool in WebOodi (OodiPSP) will be offered for new students (in PSP meeting)
- DI, MSc (tech.) students book time for PSP/HOPS meeting with Tapio Seppänen
- TtM, MHSc students book time for PSP/HOPS meeting with Eveliina/Anna and student teacher meeting with Bijay after this slide show

60 ECTS credits per academic year
- Scholarship for the second year
- Renewal of visa

Please confirm 15 ECTS for each period!
Study periods 2020 - 2021

**Autumn term**
Orientation week: 31.8. – 7.9.2020
Period 1: 24.8. - 25.10.2020

**Christmas leave:** 23.12.2020 - 5.1.2021

**Spring term**
Period 3: 1.1. – 14.3.2021
Period 4: 15.3. - 9.5.2021

Period 5 (Summer term): 10.5. - 31.7.2021
- exam retakes, practical training etc.

60 ECTS credits per academic year
- Scholarship for the second year
- Renewal of visa

Please confirm 15 ECTS for each period!
Study Outcomes

After completing the master’s degree the student is able to

- obtain and evaluate critically novel knowledge and special know-how in the field, and use and apply it independently and creatively in the biomedical engineering research and development (R&D),
- conduct research work by using scientific research methods,
- communicate orally and in writing clearly and analytically,
- produce new knowledge for the needs of industry and society,
- participate in industrial R&D and expert tasks in the field,
- implement methods for processing multimodal biomedical signals and images,
- design and implement biomedical measurement systems and health applications,
- broaden and deepen one’s know-how independently, in the view of life-long learning
Occupational Profiles of the Graduates

- Research, education, and specialist duties in academia and research institutes
- Developing and testing products in the industry as well as marketing and post-marketing support and managerial tasks
- Consulting on the use and procurement of products, evaluation of performance, maintenance, customization of appliances to clinical and research needs in health care units
- Public official tasks related to the quality control and management
Modes of Study

Contact teaching
- lectures and guided exercises or lab work
- Period 1: online education replaces contact teaching
- Period 2: will be announced soon by the university

Projects, programming exercises
- completed individually or in groups

Practical training

Independent work
Ethics of Teaching and Learning

Zero tolerance for misconduct and plagiarism!

- Our university has defined ethicality as one of the pursued values.
- Ethicality requires "in all of our actions high morals, tolerance, acceptance of difference, and honesty towards ourselves and others".
- This means that:
  1) as a student, you will not cheat or otherwise operate dishonestly in an exam or teaching situation,
  2) your course and seminar work, and other assignments and theses are of your own making, unless you are engaged in pair or group work, when the collaboration is made visible in the credits or in some other appropriate way,
  3) you will appropriately mark down the references you have used and will not claim information obtainable through e.g. Internet as your own.
- Teachers will not try, without a credit, to benefit from their students and their input.
- Staff members will be positive role models for the students and colleagues, and an example how to operate within a science community.
Information Sources and Study Tools

- For students webpages (Opiskelijalle): https://www.oulu.fi/forstudents/
  - Select your degree program
  - Also: Additional information for FMED BME students in FMED page: https://www.oulu.fi/ltk/

- WebOodi: weboodi.oulu.fi/oodi/
  - Structure of studies
  - Course and exam registrations, grades
  - Personal study plans (PSP)

- Moodle: moodle.oulu.fi
  - Course material
  - Online teaching

- Tuudo
  - Course registration to restaurant menus, map, and bus timetables, information on upcoming and ongoing courses and exams.
  - Mobile app is available for Android and iOS devices, and can be downloaded from Google Play Store and Apple App Store.

- Oulu Campus Navigator
  - Navigating indoors in Linnanmaa campus
  - Google Play Store and Apple App Store
Important for New International BME Programme Students

You have to bring the below mentioned documents for checking:
• original bachelor’s/master’s degree certificate
• original transcript of records

Documents will be returned to you afterwards

Also these will be checked at the same time:
• passport / identity check
• residence permit (non-EU citizens)

Those students who have been awarded with a scholarship have to return a signed scholarship terms and conditions form at the same time they present their other documents.
UniOulu Self-Hack

- Official orientation event for all the new students.
- One day life design workshop.
- Helps the new students to find a direction for their studies from the very beginning.
- The event is organized on **Friday 4.9.2020** (mainly online via Zoom)

Pre register for the event, latest on 1.9. by 12pm!

You can register here: [https://webropol.com/s/unioulush2020en](https://webropol.com/s/unioulush2020en)
More information: [https://www.oulu.fi/selfhack/](https://www.oulu.fi/selfhack/)
BME students

Meet the Staff and Students

Date and site to be informed later
Questions?

Thank you very much for joining us!