Research Assessment Exercise 2010–2011

Terms of Reference

24 January, 2011
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1. Introduction

This document defines the Terms of Reference for Expert Panels in the Research Assessment Exercise of the Tampere University of Technology (TUT).

Tampere University of Technology conducts scientific research in technology and architecture and provides higher education within these fields. Established in 1965, the University today employs a staff of more than 2,000. There are a total of 11,600 undergraduate and postgraduate students at TUT. The University started operating in the form of a foundation in the beginning of 2010. The new foundation status and the foundation capital provide the University a host of new opportunities for focusing and developing its research activities.

At TUT, there are 22 academic research active units belonging to five faculties and an off-campus unit in the city of Pori. Each of the five Panels will assess the units of one faculty.

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<td>Optoelectronics Research Centre</td>
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The Panels and their Units of Assessment are also listed in Appendix 1.

2. Background of the Assessment

Genuine interaction between basic and applied research, wide international networks and research projects of high quality, as well as interaction with the industry and society are the core strengths of TUT’s research. In order to further develop these strengths TUT needs to ensure that its research activities are at the highest international level or have the potential to reach this level. Therefore, it is important that the University management is aware of which areas and aspects of research require development and how this development should
be carried out. It is also essential that the units themselves can base their strategies and development activities on an impartial in-depth assessment concerning their current status in comparison to the international scientific community in their field and receive suggestions and recommendations from high-level experts.

In order to satisfy these demands, the Board of the TUT Foundation decided in autumn 2009 to organize a comprehensive international Research Assessment Exercise. The targets and main principles of the Assessment were approved by the Academic Board of TUT in spring 2010. The overall aim of the Assessment is to strengthen TUT’s research activities in accordance with its strategy for the period 2010–2013, as approved by the Board of the TUT Foundation. The Assessment will also help generate a proactive assessment culture at TUT and provide a reference point for future assessments.

3. Organization of the Assessment

The assessment process is managed by a Steering Group consisting of members representing other Finnish universities and the industry and having substantial experience in research evaluation. A Working Group comprising the Deans and the Vice-President in charge of research at TUT supports the planning of the Assessment. These groups are assisted by a Secretariat. For more detailed information on the organization, see Appendix 2.

4. Objectives and Utilization of the Assessment

The TUT Research Assessment Exercise is conducted in order to receive impartial in-depth knowledge on the quality and relevance of research at TUT and to recognize and evaluate the potential of its current research. Research at TUT should be compared to research conducted in internationally recognized units all over the world in the field in question.

The Panels are specifically invited to give recommendations and suggestions concerning the direction and organization of TUT’s research activities. This enables the Board of the TUT Foundation and the University management to develop the strategy of TUT and to decide on new development measures and targeted support for research groups and departments. It also provides the units a solid foundation for developing their research strategies and practices, including leadership and human resources policies.

The specific objectives of the Research Assessment are:

1) to assess the quality and scientific impact of research at TUT with regard to the international level
2) to assess the societal impact of research at TUT
3) to identify research entities that have the potential to develop into internationally recognized research units
4) to receive recommendations and suggestions that help the units and the University management to develop research activities at TUT.
5. Implementation of the Assessment

The Units of Assessment are departments. At TUT, the departments are units that are responsible for research and teaching in a specific academic field. The departments presently have 5 to 13 professorships.

In assessing the units, the Panels utilise:

a) background material concerning the departments collected in advance, consisting of indicators on the quality, impact and funding of research, as well as of bibliometric data from the Thomson Reuters Web of Knowledge, Scopus and local databases

b) self-evaluation reports of the Units of Assessment, including information on their most prominent research groups

c) information gained during the Site Visit Week through interviews, discussions etc.

The assessment period is the period from 1 January 2005 to 31 December 2010. The research described in the assessment materials relates to this period only. However, as part of their self-evaluation, the units may also bring forth significant achievements from the year 2011 to facilitate the assessment of the future potential of the units.

The assessment materials only include research performance of those TUT employees who were members of the Research Active Staff at the unit in question on the census date of 31 December 2010, regardless of whether they had joined the unit before or during the assessment period and regardless of whether the research submitted had been carried out at the unit or elsewhere.

Research carried out by doctoral students working in the Units of Assessment is included in the assessment. In Finnish universities, doctoral students traditionally contribute in a significant manner to research activities. However, doctoral training as such is not part of the Research Assessment Exercise.

6. Assessment Criteria and Rating Scale

There are five assessment criteria, which are introduced in sections 6.1 - 6.5. The Assessment Panels are asked to rate the performance of the Units of Assessment according to each criterion numerically on a scale from 1 to 5 and to motivate the numerical rating in written statements. The written statements and numerical ratings together form the rating of the Unit of Assessment. The rating should be based on the material submitted by the Assessment Organization and on information gained during the Site Visit Week.
The numerical rating scale is the following:

5 Outstanding International Level
4 Very Good International Level
3 Good International Level
2 Fair International Level
1 Poor International Level

In applying the quality levels, research at the Units of Assessment should be compared internationally to research at established units and groups in the same field of research.

In their written statements, the Panels are also invited to comment on the performance of individual research groups.

6.1 Scientific Quality of the Unit’s Research

This criterion refers to the originality, significance and rigour of research.

The numerical rating scale:

5 Outstanding. In terms of quality of research, the unit’s research produces new creative ideas and/or approaches and is comparable to the research conducted in the best international units in the same field of research. This requires quality which is world-leading in terms of originality, significance and rigour. Work at this level ought to be a primary point of reference in its field, i.e., a contribution which leading actors in that field ought to be aware of. Unit graded as 5 will need to be exceptional in research quality, but the Panels should consider 5 to be a realistic and attainable grade.

4 Very Good. The unit's research exhibits quality that is internationally excellent in terms of originality, significance and rigour. Work at this level is thus apt to arouse serious interest within the international academic community and in principle it could, if offered, be published by leading international publishers or in leading international journals with the most rigorous editorial standards.

3 Good. The unit’s research is of undisputed relevance for the international academic community. Work at this level could be published by well-known international publishers or in well-known international journals.

2 Fair. The unit’s research is of possible relevance for the international academic community. Research output at this level could be published abroad, by well-known national publishers or in well-known national journals.

1 Poor. The research output of the unit only sporadically includes new scientific knowledge. This can be the case, e.g., if the research profile of the unit is clearly national in the sense that the unit does not seek to contribute to the debates of the
international scientific community but rather concentrates on introducing international research trends into Finland.

6.2 Scientific Impact of the Unit’s Research

This criterion refers to the unit’s academic reputation and its reach and influence within the academic community, as well as to the significance of its contribution to the academic field in question.

The numerical rating scale:

5 **Outstanding.** The unit’s research output is published in the best forums in the field and has a notable impact on the development of the field. The members of the unit occupy important positions in the most influential academic and professional associations in the field, are sought-after experts in tenure committees, chair appointments, research assessments etc. and are regularly invited to speak at the most significant conferences in the field. The doctoral graduates of the unit are routinely hired by leading universities across the globe. The unit participates actively in international research networks and projects. The unit is successful in securing external research funding, e.g., from the Academy of Finland (i.e. the Finnish Research Councils) and the EU and, possibly, hosts national and international centres of research excellence. Relative to its size, the unit’s impact on its field of research is comparable to the impact of leading international units.

4 **Very Good.** The unit is acknowledged internationally as a leading unit in its field and a valued partner in international research projects and networks.

3 **Good.** The unit has a solid position in the international scientific community and its academic expertise is respected and well-known.

2 **Fair.** The unit is still in the process of establishing its position in the international scientific community as a recognised actor in its field; its impact on the international community is irregular.

1 **Poor.** The unit’s publication strategy and scientific impact is aimed mainly at the national scientific community.

6.3 Societal Impact of the Unit’s Research

This criterion refers to the unit’s level of interaction with the industry, business life and society, as well as the outcomes and impacts of this interaction.

This assessment targets exclusively research and therefore the societal impact of teaching and of the production of Bachelor and Master level graduates is outside of the scope of this
assessment. Similarly, the connection between the research and teaching of the units is not to be assessed.

As regards societal impact, the Outstanding International Level doesn’t necessitate primarily international interaction as the level of interaction with Finnish business life and society can be high in international comparison, even when it takes place in a national context. Panels are welcome to comment on the applicability of this understanding.

The numerical rating scale:

5 **Outstanding.** Engagement with the society is ubiquitous in the research activities of the unit. The research at the unit is highly relevant for the needs of the public and/or private sector making the unit an exceedingly valued research partner in R&D projects also outside the academia. The members of the unit are sought-after experts in the public and private sector, and the unit is a key agent in the development of the society at large. The interaction between the unit’s research and the society is comparable to that of leading international units in the field of research of the unit.

4 **Very Good.** In international comparison within the unit’s field of research, the interaction between the unit’s research and the society stands out as exceptionally dynamic and wide-ranging.

3 **Good.** In international comparison within the unit’s field of research, the interaction between the unit’s research and society is at the level expected of established academic units in the same field.

2 **Fair.** In international comparison within the unit’s field of research, the level of interaction between the unit and the society is still at a developing stage.

1 **Poor.** In international comparison within the unit’s field of research, the level of interaction between the unit and the society is insufficient.

6.4 Research Environment at the Unit of Assessment

This criterion refers to issues such as research leadership, the availability and quality of support services, research infrastructure, databanks, technical staff, the teaching load of research active staff, the student/staff ratio etc.

The Panels are asked to adopt a specifically constructive perspective: Which aspects of the unit’s research environment are assets that should be further strengthened? Are there structural obstacles that prevent the unit from realising its full potential for international excellence in research? Although the Panels are not evaluating individuals as such, the Panels are also asked to assess the research profiles of the units, including the competence profile of the unit’s research active staff.
The numerical rating scale:

5 **Outstanding.** The research environment of the unit is fully comparable to the best international units in the field in terms of research management, strategy, environment and infrastructure.

4 **Very Good.** In international comparison the unit is able to offer an excellent research environment for high-class international researchers in the field of research of the unit.

3 **Good.** The unit is able to offer a research environment comparable to established academic institutions in the field across the world.

2 **Fair.** The unit’s research environment is still developing towards the level expected from a reputable unit in the international scientific community in the unit’s field of research.

1 **Poor.** The unit’s research environment is not at an internationally comparable level.

### 6.5 Future Potential of the Unit of Assessment

The future potential of a unit is dependent on the viability of its research agenda, the appropriateness of its human resources and infrastructure, and its leadership and organization.

The Panels should focus on such indicators as long-term strategic planning of the unit’s research, including human resources strategy and the focus of research. The Panels should consider how realistic the unit is in recognizing its strengths and weaknesses, opportunities and threats, and whether the unit has a carefully contemplated plan for managing such factors. Also issues such as the age and career profile of the research active staff, the size of the unit as well as the ability to attract high-quality international doctoral students and researchers may play a role here. Similarly, important indicators of future research potential may include the ability to secure competitive funding, the capacity to focus the unit’s research on topical issues, the existence of promising international collaboration networks etc.

In summary, the future potential of a unit consists of the following elements:

a) the potential of its research groups amidst dynamic international competition,

b) the potential of its research environment to provide support for the chosen research strategy,

c) future leadership potential,

d) the potential of the chosen research objectives and research topics to make an impact at the international level on the scientific community and society at large, and

e) the potential of emerging research areas.
The numerical rating scale:

5 Outstanding. The unit has the potential to be a flagship of TUT’s research. The Panel expects that within the next 5 to 10 years the unit will produce international breakthroughs in its field of research and attract leading scholars and promising doctoral students to work at the unit. In the foreseeable future, the unit has the potential to reach the level of excellence comparable to the most notable units in the world in the unit’s field of research.

4 Very Good. The unit has the potential to establish itself as a well-known and respected actor in its field of research in the international scientific community. Within the next 5 to 10 years, the unit can be expected to have reached the Very Good level in the quality and impact of its research and to be a much valued partner in international research networks.

3 Good. Within the next 5 to 10 years, the unit has the potential to secure a position in the international scientific community as a solid performer and a trusted partner in international research networks.

2 Fair. The unit has the potential to be a noted local actor in its field of research that is expected to make occasional contributions to the activities of the international scientific community.

1 Poor. The unit must work hard to be able to establish itself as an internationally recognised unit in its field of research within the foreseeable future.

7. Report Outline

In their reports, the Panels are asked to present:

1) A general statement concerning the focus, structure and performance of the Unit of Assessment, including the balance between basic and applied research and the unit’s standing in relation to the strategy of the University.

2) A numerical rating and a written statement of the quality of the research of the Unit of Assessment (guidelines available at Section 6.1 above)

3) A numerical rating and a written statement of the impact of the research of the Unit of Assessment on the international scientific community (6.2)

4) A numerical rating and a written statement of the societal impact of the research of the Unit of Assessment (6.3)

5) A numerical rating and a written statement of the strengths and weaknesses of the research environment at the Unit of Assessment (6.4)
6) A numerical rating and a written statement of the future potential of the Unit of Assessment (6.5)

7) Recommendations for the future.

In giving their recommendations and suggestions for the future, in section 7 of the report, the panels are expected to advise the units in outlining a roadmap from the present quality level to the excellent international level and thereby to develop the research practices of the units, based on assessments in each of the five assessment criteria. Key questions to be addressed are:

a) what are the main strengths and weaknesses of the unit?
b) what are the opportunities and challenges of the unit?
c) were research groups that stand out from the general level of the unit found in the assessment?
d) were research groups that have potential to become international flagships in their research area found in the assessment?
e) what measures should the unit take to improve its performance?

8. Working Arrangements of the Panels

To direct the Panel's work, a Chair is appointed for each Assessment Panel. It is the Chair’s responsibility to ensure that the Panel produces its reports on time. Each Panel should ensure through discussions that the Panel Members have a similar understanding of the application of the assessment criteria and the rating scale. The Panels should also ensure that the Assessment Report takes into account all the material available to them, including all the assessment documents, self-assessments, site visits and interviews. Each Assessment Panel is expected to finish the final drafts of the Panel’s Assessment Reports during the Site Visit Week in Finland. The Assessment Reports are to be written on the Assessment Form, which is provided by the Assessment Organization. The Panel Chairs will have an opportunity to give and receive feed-back in a post-assessment meeting in Finland.

The Assessment and its organization are funded by the TUT, which will pay expert fees to the Panel Chairs and Panel Members as well as reimburse all the travel and accommodation expenses relating to the Site Visit Week and the Chairs’ post assessment meeting.

The reports of the Assessment Panels will be included in the Final Report without any changes in substance. The Final Report, which will also comprise the results of a separate bibliometric analysis of TUT publications based on the Thomson Reuters Web of Knowledge database, will be published by TUT.
8.1 Desk Work and Site Visit Week

Panel Members base their assessment on desk work at their home institutions prior to the site visits and on interviews and discussions during the Site Visit Week in Finland.

Desk work is carried out prior to the Site Visit Week and is based on
- details concerning the Research Active Staff of the Units of Assessment
- details concerning the funding of the Units of Assessment
- details concerning the research output of the researchers in the Units of Assessment
- the self-assessment documents of the Units of Assessment
- background information about the Finnish higher education and research system and TUT

All the materials will be provided to the Panel Members by the Assessment Organization five weeks before the Site Visits.

During the Site Visit Week in Finland the Panel Members can get acquainted with the Units of Assessment, interview researchers representing various stages of the research career, and meet representatives of the University management. In addition, there will be opportunities for the Panel Chairs to meet with each other and discuss e.g. the application of the assessment criteria and rating.

The timetables for the Site Visit Week will be provided by the Assessment Organization.

8.2 Confidentiality

The Panel Members agree to refrain from making use and/or divulging to third parties any non-public material, facts, information, documents or other matters brought to the attention of Panel Members during the Research Assessment Exercise. The materials included in the Assessment Reports as well as all the ratings are strictly confidential until the publication of the Final Report that summarises all the results. The Final Report is the main instrument for communicating the results of the Assessment Exercise.

8.3 Conflict of Interest

The Panel Members are required to sign a declaration of the lack of conflict of interest. For example, the Panel Members should not have been engaged in joint research projects with the researchers or units they assess or have written joint publications with them, from the beginning of 2005 until present time. A Panel Member is disqualified if his/her impartiality is endangered. If a Panel Member is contacted by a member of the Units of Assessment, the Panel Member should discuss the issue immediately with the TUT Assessment Organization.
Appendix 1: Panels

Each Panel will assess the departments of one faculty and write a report on each Unit of Assessment. A Panel shall consist of a Chair and 3 to 7 Panel Members.

Panel 1: Faculty of Automation, Mechanical and Materials Engineering
Department of Automation Science and Engineering
Department of Intelligent Hydraulics and Automation
Department of Materials Science
Department of Mechanics and Design
Department of Production Engineering

Panel 2: Faculty of Built Environment
Department of Civil Engineering
School of Architecture

Panel 3: Faculty of Business and Technology Management
Department of Business Information Management and Logistics
Department of Industrial Management
Pori Unit's research in Industrial Management*

Panel 4: Faculty of Computing and Electrical Engineering
Department of Electrical Energy Engineering
Department of Communications Engineering
Department of Computer Systems
Department of Electronics
Department of Signal Processing
Department of Software Systems
Pori Unit's research in Electronics and Information Technology*

Panel 5: Faculty of Science and Environmental Engineering
Department of Biomedical Engineering
Department of Chemistry and Bioengineering
Department of Energy and Process Engineering
Department of Mathematics
Department of Physics
Optoelectronics Research Centre

* Pori Unit is an off-campus unit in the city of Pori. The research conducted at the Pori Unit is close to the research of two faculties and thus falls under two Panels.
Appendix 2: Assessment Organization

Steering Group:
Vice-Dean, Professor Outi Krause, Aalto University, Chair
(outi.krause@aalto.fi, +358 50 384 1698)
Professor Sirpa Jalkanen, University of Turku, Member of the Board of the TUT Foundation
Professor Erkki Oja, Aalto University
M.Sc. (Eng.), Dr.Tech. (hon.) Stig Gustavson, Chairman of the Boards of several major
Finland-based companies and Chairman of the Board of Technology Academy Finland
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