

Assessment report
Limited Framework Programme Assessment

Master Chemical Engineering

University of Twente

Contents of the report

1. Executive summary	2
2. Assessment process	4
3. Programme administrative information.....	7
4. Findings, considerations and assessments per standard	8
4.1 Standard 1: Intended learning outcomes	8
4.2 Standard 2: Teaching-learning environment	11
4.3 Standard 3: Student assessment.....	14
4.4 Standard 4: Achieved learning outcomes	16
5. Overview of assessments.....	17
6. Recommendations	18

1. Executive summary

In this executive summary, the panel presents the main considerations which led to the assessment of the quality of the Master Chemical Engineering programme of University of Twente. The programme was assessed according to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, published on 20 December 2016 (Staatscourant nr. 69458).

The panel considers the programme objectives to be sound and especially appreciates the strong research orientation of the programme. Students are educated at an advanced level in the disciplines of either materials science or process technology. The preceding Bachelor Chemical Science and Engineering programme and this Master programme allow student to be broadly educated in this field and to select one of the specialisations in the Master programme. The panel considers this bachelor-master trajectory to be a very valuable concept. The panel appreciates students being offered the opportunities to develop their skills as researchers or as designers/engineers or as managers/organisers.

The objectives of the programme are within the boundaries of the domain-specific reference framework for academic chemical sciences programmes. The panel appreciates the efforts by the joint programmes in chemical sciences in the Netherlands to draft this framework and regards this to be a sound and up-to-date description of this domain. The profile of this University of Twente programme may be clearly distinguished within the framework.

The panel fully supports the programme intentions to prepare students for positions in academic research, in industry or as first-grade teacher in secondary education. The panel acknowledges the relevance for the programme to monitor current trends in industry. At the same time, the panel advises to formulate future trends, relevant for the programme, in more clear terms to allow the programme to adjust to these trends for a sharper positioning in the professional field.

The intended learning outcomes of the programme cover the programme objectives, are very clearly and explicitly formulated, meet international frameworks and conform to the master level.

The panel regards the number of incoming students in the programme to be appropriate.

The curriculum matches the intended learning outcomes of the programme. The panel appreciates the contents of the curriculum and considers the courses to be solid in terms of contents. The panel regards the curriculum to be research-based, up-to-date, new trends being incorporated, and coherent. The panel suggests to involve in courses lecturers who do research in the course domain, as in some of the courses this may be less the case.

The panel regards the team of lecturers to be very motivated and enthusiastic, their educational capabilities and research track records being up to standard. For some courses, lecturers with research backgrounds would be required. The panel perceived strong alliance in views on the programme between programme management and lecturers. The lecturers' capacities are very much appreciated by students.

The panel approves of the entry requirements and admission procedures of the programme, and is positive about the pre-master programme for students not entirely meeting the entry requirements.

The educational concept and the study methods promote students to actively engage in self-directed and autonomous learning. The panel finds the number of lab courses adequate, the difference between the specialisations being justified. The students-to-staff ratio and the number of hours of face-to-face education meet the standards. The study guidance is up to standard. The panel considers the programme to be feasible and the study load to be evenly distributed. The student success rates are appropriate.

The examination and assessment policies of the programme are appropriate. The position and authority of the Board of Examiners are adequate, the Board being very serious and very professional in executing their duties.

The panel approves of the examination methods and notes these to be consistent with the goals and the contents of the courses. The panel supports programme management's intentions to prevent free-riding in group projects and assignments. The panel is pleased to see academic and professional skills being assessed and encourages programme management to assess these more systematically in the framework of a teaching-learning trajectory in the curriculum. Students are offered appropriate supervision for the Master assignments. The assessment procedures are up to standard, the assignment committee involving at least three examiners and being conducted using scoring forms with relevant criteria. The measures taken to ensure the validity, reliability and transparency of examinations and assessments are adequate. The panel suggests to strengthen the peer review of the design of examination assignments.

The course examinations are up to standard. The panel supports the grades awarded to the Master assignments by the programme examiners, judging the assignments to be solid. The panel considers the molecular & materials engineering specialisation assignments to have achieved very high academic standards. The chemical & process engineering specialisation assignments are regarded by the panel to be well-elaborated studies on complex problems and complex problem solving in this field. As existing methods tend to be used in these assignments, the panel advises to further emphasise the scientific approach to research as well as the development and application of new methods for solving chemical engineering problems. The panel is convinced that students having completed the programme reached the intended learning outcomes and regards the graduates to be well prepared for positions both in academic research and in industry in this domain.

The panel which conducted the assessment of the Master Chemical Engineering programme of University of Twente assesses this programme to meet the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, judging the programme to be good. Therefore, the panel recommends NVAO to accredit this programme.

Rotterdam, 5 February 2019

Dr. C. Terlouw
(panel chair)

drs. W. Vercouteren
(panel secretary)

2. Assessment process

The evaluation agency Certiked VBI received the request by University of Twente to support the limited framework programme assessment process for the Master Chemical Engineering programme of this University. The objective of the programme assessment process was to assess whether the programme would conform to the standards of the limited framework, as laid down in the NVAO Assessment framework for the higher education accreditation system of the Netherlands, published on 20 December 2016 (Staatscourant nr. 69458).

Management of the programmes in the assessment cluster WO Scheikunde convened to discuss the composition of the assessment panel and to draft the list of candidates.

Having conferred with management of the Master Chemical Engineering programme of University of Twente, Certiked invited candidate panel members to sit on the assessment panel. The panel members agreed to do so. The panel composition was as follows:

- Dr. C. Terlouw, associate professor emeritus Enrolment Management and Educational Transition, director Information Centre for Transition Issues, Saxion University of Applied Sciences (panel chair);
- Prof. dr. A.H.T. Boyen, associate professor emeritus, Faculty of Sciences and Bio-engineering Sciences, Faculty of Medicine and Pharmacy, Vrije Universiteit Brussel (panel member);
- Prof. dr. M.K. Van Bael, professor Inorganic and Physical Chemistry, head of Inorganic and Physical Chemistry Research Group, University of Hasselt (panel member);
- Prof. dr. ir. G.B. Marin, professor Chemical Reaction Engineering, head Laboratory for Chemical Technology, Ghent University (panel member);
- Drs. O. de Vreede, head Innovation and Human Capital, VNCI, Association of the Dutch Chemical Industry (panel member);
- L. Büller BSc, student Master Life Science and Technology, Delft University of Technology (student member).

On behalf of Certiked, drs. W. Vercouteren served as the process coordinator and secretary in the assessment process.

All panel members and the secretary confirmed in writing being impartial with regard to the programme to be assessed and observing the rules of confidentiality. Having obtained the authorisation by the University, Certiked requested the approval of NVAO of the proposed panel to conduct the assessment. NVAO have given their approval.

To prepare the assessment process, the process coordinator convened with management of the programme to discuss the outline of the self-assessment report, the subjects to be addressed in this report and the site visit schedule. In addition, the planning of the activities in preparation of the site visit were discussed. In the course of the process preparing for the site visit, programme management and the Certiked process coordinator regularly had contact to fine-tune the process. The activities prior to the site visit have been performed as planned. Programme management approved of the site visit schedule.

Well in advance of the site visit date, programme management sent the list of final projects of graduates of the programme of the most recent years. Acting on behalf of the assessment panel, the process coordinator selected the theses of 15 graduates from the last two years. The grade distribution in the selection was ensured to conform to the grade distribution in the list, sent by programme management.

The panel chair and the panel members were sent the self-assessment report of the programme, including appendices. In the self-assessment report, the student chapter was included. In addition, the expert panel members were forwarded a number of theses of the programme graduates, these theses being part of the selection made by the process coordinator.

Several weeks before the site visit date, the assessment panel chair and the process coordinator met to discuss the self-assessment report provided by programme management, the procedures regarding the assessment process and the site visit schedule. In this meeting, the profile of panel chairs of NVAO was discussed as well. The panel chair was informed about the competencies, listed in the profile. Documents pertaining to a number of these competencies were presented to the panel chair. The meeting between the panel chair and the process coordinator served as the briefing for panel chairs, as meant in the NVAO profile of panel chairs.

Prior to the date of the site visit, all panel members sent in their preliminary findings, based on the self-assessment report and the final projects studied, and a number of questions to be put to the programme representatives on the day of the site visit. The panel secretary summarised this information, compiling a list of questions, which served as a starting point for the discussions with the programme representatives during the site visit.

Shortly before the site visit date, the complete panel met to go over the preliminary findings concerning the quality of the programme. During this preliminary meeting, the preliminary findings of the panel members, including those about the theses were discussed. The procedures to be adopted during the site visit, including the questions to be put to the programme representatives on the basis of the list compiled, were discussed as well.

On 18 September 2018, the panel conducted the site visit on the University of Twente campus. The site visit schedule was as planned. In a number of separate sessions, the panel was given the opportunity to meet with the Faculty representatives, programme management, Board of Examiners members, lecturers and final projects examiners, and students and alumni.

In a closed session near the end of the site visit, the panel considered every one of the findings, weighed the considerations and arrived at conclusions with regard to the quality of the programme. At the end of the site visit, the panel chair presented a broad outline of the considerations and conclusions to programme representatives.

Clearly separated from the process of the programme assessment, the assessment panel members and programme representatives met to conduct the development dialogue, with the objective to discuss future developments of the programme.

The assessment draft report was finalised by the secretary, having taken into account the findings and considerations of the panel. The draft report was sent to the panel members, who studied it and made a number of changes. Thereupon, the secretary edited the final report. This report was presented to programme management to be corrected for factual inaccuracies. Programme management were given two weeks to respond. Having been corrected for these factual inaccuracies, the Certiked bureau sent the report to the University Board to accompany their request for re-accreditation of this programme.

3. Programme administrative information

Name programme in CROHO: M Chemical Engineering
Orientation, level programme: Academic Master
Grade: MSc
Number of credits: 120 EC
Specialisations: Molecular & Materials Engineering
Chemical & Process Engineering
Location: Enschede
Mode of study: Full-time (language of instruction English)
Registration in CROHO: 21PH-60437

Name of institution: University of Twente
Status of institution: Government-funded University
Institution's quality assurance: Approved

4. Findings, considerations and assessments per standard

4.1 Standard 1: Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

The Master Chemical Engineering programme is one of the programmes offered by the Faculty of Science and Technology of University of Twente. The Faculty Board, chaired by the dean of the Faculty, has the responsibility for the quality of this and the other Faculty programmes. The programme director, assisted by the programme coordinator, takes care of the day-to-day management of the programme. The Programme Committee, being composed of an equal number of lecturers and students, advises programme management on quality issues. The Board of Examiners has the authority to ensure the quality of examinations and assessments of the programme. Both the Programme Committee and the Board of Examiners are shared by this Master programme and the Bachelor Chemical Science and Engineering programme. The Curriculum Committees of the specialisations discuss the curriculum and curriculum changes in these specialisations.

The programme is a two-year, research-based master programme with two distinct specialisations, being molecular & materials engineering and chemical & process engineering. The programme objectives are to educate students in the chemistry, materials science or process technology disciplines at academic master level and to provide them with the knowledge, understanding and skills to act autonomously and professionally in chemical engineering or related disciplines. Within the disciplines mentioned, a range of sub-disciplines are covered, aligned with the research done by research groups involved in the programme and related to new developments in these disciplines.

The objectives of the programme conform to the domain-specific reference framework for the chemical sciences in the Netherlands, which has been drafted by the joint programmes of this assessment cluster in the Netherlands. In this domain-specific framework, reference has been made to international frameworks and benchmark statements. This University of Twente programme may be regarded to be placed in the chemistry and chemical engineering sub-domains of the chemical sciences.

The programme aims primarily to prepare students for positions on the labour market in the fields of scientific research, process development, product development or secondary education. Students are prepared for PhD trajectories or for positions in industry. Students may opt for positions as grade-one qualified teachers in Chemistry in Dutch secondary education. The programme endeavours to educate students either as researchers or as designers/engineers or as managers/organisers in these domains, depending upon their ambitions and talents.

The programme objectives keeps abreast of current trends in the professional field, maintaining relations with industry. Many lecturers in the programme have backgrounds in industry. The programme has contacts with spin-off companies in the Twente region. Part-time and guest lecturers from industry are involved in courses. For the programme, the alumni advisory committee, being composed of industry representatives, has been put in place.

The programme objectives have been translated into the intended learning outcomes of the programme. The intended learning outcomes specify, among others, thorough knowledge of one of the relevant fields within the chemical engineering discipline, knowledge of and skills in complex research and design methodologies, academic skills, such as reasoning, judgemental, communication, and collaborative skills and societal and ethical awareness.

Programme management demonstrated the programme intended learning outcomes to meet a number of international frameworks in this domain, such as the European Federation of Chemical Engineering qualifications and the Euromaster qualifications of European Chemistry Thematic Network Association. In addition, the intended learning outcomes corresponds to the Meijers' criteria, showing these to match the master level. The programme wants to achieve the Institution of Chemical Engineers (IChemE) accreditation.

Considerations

The panel considers the programme objectives to be sound. The panel especially appreciates the strong research orientation of the programme. Students are educated at advanced levels in the disciplines of either materials science or process technology and also on interfaces, such as catalysis and membrane science.

The preceding Bachelor Chemical Science and Engineering programme and this Master programme allow student to be broadly educated in this field and to select one of the specialisations in the Master programme. The panel considers this bachelor-master trajectory to be a very valuable concept. The panel appreciates students being offered the opportunities to develop their skills as researchers or as designers/engineers or as managers/organisers.

The objectives of the programme are within the boundaries of the domain-specific reference framework for academic chemical sciences programmes. The panel appreciates the efforts by the joint programmes in chemical sciences in the Netherlands to draft this framework and regards this to be a sound and up-to-date description of this domain. The profile of this University of Twente programme may be clearly distinguished within the framework.

The panel fully supports the programme intentions to prepare students for positions in academic research, in industry or as first-grade teacher in secondary education. The panel acknowledges the relevance for the programme to monitor current trends in industry. At the same time, the panel advises to formulate future trends, relevant for the programme, in more clear terms to allow the programme to adjust to these trends for a sharper positioning in the professional field.

The objectives have been well-translated into the intended learning outcomes of the programme. The panel finds the intended learning outcomes to be very clearly and explicitly formulated. The intended learning outcomes meet international frameworks and conform to the master level.

Assessment of this standard

These considerations have led the assessment panel to assess standard 1, Intended learning outcomes, to be good.

4.2 Standard 2: Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

The number of incoming students in the programme fluctuated somewhat, being on average 60 incoming students in the last three years. About 50 % of the incoming students come from the Bachelor Chemical Science and Engineering programme of University of Twente. About 30 % of the students enrolling yearly are international students. The proportions of students coming from other universities or from higher vocational education institutes (hbo) are limited.

The curriculum has a study load of 120 EC and takes two years to complete. Programme management presented a table, mapping the intended learning outcomes to the curriculum components. The structure of the specialisations' curricula differs to some extent, but not fundamentally. The curricula are composed of compulsory core courses (30 EC to 40 EC), electives (20 EC to 30 EC), internship (20 EC) and Master assignment (40 EC to 45 EC). The contents of the courses are closely related to the research subjects of the research groups. Up-to-date scientific literature is studied and new trends in research are addressed. The core courses cover specialisation subjects in broader terms, whereas the electives are more focused. As the research interests of the Chemical Engineering department shifted the last few years to include new, innovative subjects, the curriculum changed correspondingly. Specific new topics are addressed in new courses. New trends, such as digitalisation are considered as well. Ethical problems and safety issues are also covered. In the courses, the professional practice is touched upon in cases, derived from the professional field, excursions and the internship. In a number of courses, students are trained in academic and professional skills, such as problems-solving skills, presentation skills and reporting skills. Students are given the opportunities to develop themselves in the researcher's and designer's roles. The Master assignment (40 EC to 45 EC) is the final component of the curriculum, requiring students to do an extensive, individual research or design project in a largely self-directed manner. Students may opt for the two-year Master Science Education & Communication programme, allowing them to obtain the grade-one teaching qualification in Chemistry. The first year focuses on chemistry subjects, whereas the second year regards educational knowledge and skills. Students may also take the international Erasmus Mundus Master Membrane Engineering programme.

About 42 researchers in the chemical engineering field are involved in the programme as lecturers. In addition, about 13 lecturers coming from other Faculties or departments take part in the programme. Lecturers are active researchers, doing research within one of the chemical engineering research groups. All of the chemical engineering lecturers and the vast majority of the other lecturers have a PhD degree. The proportion of lecturers being BKO-certified is about 65 % including exemptions, whereas another 21 % of the lecturers are in the process of obtaining this certificate. In addition to this permanent staff, PhD students supervise tutorials and Master assignments. As has been said, part-time and guest lecturers from industry are involved in the programme. In the student chapter and in the meeting with the panel, students expressed to greatly appreciate the knowledge and the teaching qualities of the lecturers.

Applicants having completed the Bachelor Chemical Science and Engineering of University of Twente are admitted unconditionally. Students with related bachelor degrees from University of Twente have to have taken specific courses in their bachelor programme. Students with Bachelor Chemistry degrees from Dutch universities have to take the pre-master programme of 30 EC maximum. Students having relevant bachelor degrees from higher vocational education institutes (hbo) are to take this pre-master programme as well. International students must have relevant bachelor degrees, should report a grade point average of at least 7.5 in their bachelor programme and should be proficient in English. Applications are screened by the programme director and, in case of international students, by the Admission Committee.

The programme educational concept is to promote self-directed and autonomous learning on the part of the students. The average number of hours of face-to-face education in the cursory parts of the curriculum is about 15 to 17 hours per week. In the internships and during Master assignments, students are guided individually. The study methods include lectures, tutorials, lab courses and projects. The lab courses hours in the cursory parts of the curriculum are about 450 hours in the molecular & materials engineering specialisation and about 240 hours in the chemical & process engineering specialisation. In a number of courses, two or more lecturers are involved. Students in each of the specialisations may turn to the track advisors for advice about their studies. The programme study advisor may be consulted for drafting the study plan and for all issues regarding study progress or study problems. International students are guided by the coordinator internationalisation and the tutor from the research group students have selected. The student success rates after two years are on average about 40 % and after three years they are on average 84 % (figures for last six cohorts). The three-year completion target has been set at 90 % by programme management.

Considerations

The panel regards the number of incoming students in the programme adequate.

The curriculum matches the intended learning outcomes of the programme. The panel appreciates the contents of the curriculum and considers the courses to be solid in terms of contents. The panel regards the curriculum to be research-based and to be up-to-date, new trends being incorporated. The curriculum is regarded by the panel to be coherent. The panel suggests to involve in courses lecturers who do research in the course domain, as in some of the courses this may be less the case.

The lecturers in the programme are well-reputed researchers and skilled teachers. Their educational capabilities are regarded by the panel to be up to standard. The panel considers them to be a very motivated and enthusiastic team of lecturers. For some courses, lecturers with research backgrounds in the courses they teach, would be required. The panel perceived strong alliance in views on the programme between programme management and lecturers. The panel notes the capacities of the lecturers to be very much appreciated by students.

The entry requirements and admission procedures of the programme are appropriate. The admission requirements are adequately checked by the programme director and the Admission Committee. The panel is positive about offering the pre-master programme to students not entirely meeting the entry requirements.

The panel appreciates the educational concept and the study methods of the programme, as these promote students to actively engage in self-directed and autonomous learning. The panel finds the number of lab courses adequate, the difference between the specialisations being justified. The students-to-staff ratio and the number of hours of face-to-face education in the programme meet the standards. The study guidance by track advisors, the study advisor and, for the international students, the internationalisation coordinator is up to standard. Although the programme is challenging, the panel considers the programme to be feasible and the study load to be evenly distributed. The student success rates are appropriate.

Assessment of this standard

These considerations have led the assessment panel to assess standard 2, Teaching-learning environment, to be good.

4.3 Standard 3: Student assessment

The programme has an adequate system of student assessment in place.

Findings

The examinations and assessments in the programme are governed by the programme framework in this respect and the Education and Examination Regulations, both of these complying with University of Twente guidelines. As has been indicated, the Board of Examiners has the authority to ensure the quality of examinations and assessments of the programme. The Board works along rules, which meet University of Twente guidelines. One of the members of the Board is an external member.

The examination methods adopted in the courses include written examinations, homework assignments, case studies, oral presentations, and group assignments and presentations. Academic skills' assessments, such as writing skills, are included in the course assessments. Most courses are assessed by means of more than one examination method. In case of group work, individual performances by students are assessed by means of oral assessments. Peer review among students has been adopted, but not in all courses.

The Master assignment is an individual research project, mostly done at University of Twente research groups. If done outside of university, one of the university professors takes responsibility. Students are presented topics by research groups. During the assignment, students do their work at one of the research groups. Day-to-day supervisors may be PhD students, acting under the responsibility of supervisors. At completion of their Master assignment, students are to submit the written report and are to present and defend the results. The assignment is assessed by the Master assignment committee, being composed of at least three members and including at least one member of the permanent academic staff of another research group. The assignment is assessed on both the chemical-technological research aspects, such as problem analysis, theoretical and experimental approaches and analysis of results and the general aspects, such as professional attitude, collaboration, originality and communication. The Master assignment committee uses a scoring form for their assessment, with the assessment criteria listed.

In the programme, measures have been taken to ensure the validity, reliability and transparency of examinations and assessments. The principle of constructive alignment has been adopted, aligning the learning goals, study methods and examination methods in the courses. The Board of Examiners appoints the examiners. Examination drafts are to be peer-reviewed by fellow examiners. Examinations include test matrices. In case of deviant grade distributions, examinations are analysed and discussed.

Considerations

The panel considers the examination and assessment policies for the programme to be appropriate, these being in line with the University of Twente guidelines. The position and authority of the programme Board of Examiners are adequate. The panel regards the Board as being very serious and very professional in executing their duties.

The panel approves of the examination methods adopted in the programme, noting these to be consistent with the goals and the contents of the courses. The panel supports programme management's intentions to prevent free-riding in group projects and assignments. The panel is pleased to see academic and professional skills being assessed and encourages programme management to assess these more consistently.

The supervision and assessment processes for the Master assignments are well-organised. Students are offered appropriate supervision. The assessment procedures are up to standard, the Master assignment committee involving at least three examiners and being conducted using scoring forms with relevant criteria.

The measures taken to ensure the validity, reliability and transparency of examinations and assessments are adequate. The panel suggests to strengthen the peer review of examinations.

Assessment of this standard

The considerations have led the assessment panel to assess standard 3, Student assessment, to be satisfactory.

4.4 Standard 4: Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.
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Findings

The panel studied the examinations of a number of courses of the programme.

The panel also reviewed the Master assignments of fifteen graduates of the programme with different grades. In the assignments, students have to demonstrate to be able to conduct an extensive individual research or design project within the domain of the programme. The average grade of the Master assignments of the last three years is 7.6 for the research aspects and 7.7 for the general aspects. A number of the molecular & materials engineering specialisation graduates co-authored publications.

Graduates of the programme find suitable positions very easily. The positions they acquire differ across the specialisations. About 60 % of the graduates of the molecular & materials engineering specialisation find research positions. About 42 % of the graduates go on in PhD trajectories. About 60 % of the graduates of the chemical & process engineering specialisation obtain positions in industry, about 30 % of them proceed to research positions and about 22 % of the graduates go on as PhD students. The vast majority of the alumni are satisfied to very satisfied about the programme as preparation for the labour market.

Considerations

The panel regards the course examinations, which were reviewed by panel members, to be up to standard.

The panel supports the grades awarded to the Master assignments by the programme examiners, judging the assignments to be solid. The panel considers the molecular & materials engineering specialisation assignments to have achieved very high academic standards. The chemical & process engineering specialisation assignments are regarded by the panel to be well-elaborated studies on complex problems and complex problem solving in this field. As existing methods tend to be used in the latter assignments, the panel advises to further emphasise in these assignments the scientific approach to research as well as the development and application of new methods for solving chemical engineering problems.

The panel is convinced that students having completed the programme reached the intended learning outcomes and regards the graduates of this programme to be well prepared for positions both in academic research and in industry in this domain.

Assessment of this standard

The considerations have led the assessment panel to assess standard 4, Achieved learning outcomes, to be good.

5. Overview of assessments

Standard	Assessment
Standard 1. Intended learning outcomes	Good
Standard 2: Teaching-learning environment	Good
Standard 3: Student assessment	Satisfactory
Standard 4: Achieved learning outcomes	Good
Programme	Good

6. Recommendations

In this report, a number of recommendations by the panel have been listed. For the sake of clarity, these have been brought together below.

- To formulate future trends, relevant for the programme, in more clear terms to allow the programme to adjust to these trends. for a sharper positioning in the professional field.
- To involve in courses lecturers who do research in this domain, as in some of the courses this may be less the case.
- To assess academic and professional skills more systematically in the framework of a teaching-learning trajectory.
- To try and prevent free-riding, in line with programme management's intentions.
- To strengthen peer review of the design of examination assignments among examiners.
- To further emphasise, in the final Master assignments in the domain of chemical & process engineering, the scientific approach to research as well as the development and application of new methods for solving chemical engineering problems.