Grant agreement number: 779730

WP1 - Methodology

D1.3 Definition of learning outcomes for each level, teaching methodology and module assessment

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About TeacHy

As the FCHT industry gradually emerges into the markets, the need for trained staff becomes more pressing. TeacHy2020, or short TeacHy, specifically addresses the supply of undergraduate and graduate education (BEng/BSc, MEng/MSc, PhD etc.) in fuel cell and hydrogen technologies (FCHT) across Europe.

TeacHy2020 will take a lead in building a repository of university grade educational material, and design and run an MSc course in FCHT, accessible to students from all parts of Europe. To achieve this, the project has assembled a core group of highly experienced institutions working with a network of associate partners (universities, vocational training bodies, industry, and networks). TeacHy offers these partners access to its educational material and the use of the MSc course modules available on the TeacHy site. Any university being able to offer 20 to 30% of the course content locally, can draw on the other 80 to 70% to be supplied by the project (and its successor entity that will support the platform post-project).

This will allow any institution to participate in this European initiative with a minimised local investment. TeacHy will be developing solutions to accreditation and quality control of courses, and support student and industry staff mobility by giving access to placements. Schemes of Continuous Professional Development (CPD) will be integrated into the project activities. We expect a considerable leverage effect which will specifically enable countries with a notable lack of expertise, not only in Eastern Europe, to quickly be able to form a national body of experts.

TeacHy will offer some educational material for the general public (e.g. MOOC’s), build a business model to continue operations post-project, and as such act as a single-stop shop and representative for all matters of European university and vocational training in FCHT. The project partnership covers the prevalent languages and educational systems in Europe. The associated network has over 70 partners, including two IPHE countries, and a strong link to IPHE activities in education.

Deliverables Abstract

This deliverable covers the activities outlined in Task 1.3 and Deliverable 1.3 taken from the TeacHy Description of Work as shown below:

T1.3 All partners will agree and contribute towards the learning outcomes/objectives for every module topic. In addition, the teaching methodology will be appropriately identified for delivery of the course training material and the roles of the teacher, student and content developer. Module assessment methods and the criteria to be applied will be developed here.

D1.3 The learning outcomes/objectives for every module topic will be defined including the teaching methodology and module assessment as well as the roles of the teacher, student and content developer

Presented here is the proposed TeacHy curriculum adopted from that developed under the TrainHy project, listing the module learning outcomes and assessment methods. Guidelines for teaching methodologies are outlined for the MSc course. Finally, a detailed role description and feedback pathway is given for the roles of teacher, course developer and student.

This deliverable solely concerns university teaching. Any aspects relating to CPD formats will be covered in other places.

1 Learning objectives and assessment

The following lists have been updated from the status of the course content catalogue D3.2 after revision following the mid-term review. The information presented in both documents on learning outcomes should now be largely identical and coincides with the information given in the accreditation forms for the University of Birmingham course implementation. The list specifies the learning objectives for the individual module topics and also details the assessment approach.

1.1 Fundamental modules

1.1.1 C1 - Thermodynamics and electrochemistry

Learning outcomes

Upon completion of the module, the student will be able to:

- Apply the methods and techniques learned to review, extend and apply their knowledge and understanding, to initiate and perform short projects;
- Critically evaluate arguments and data, to construct judgements and appropriate questions to enable a solution (or solutions) to a problem to be reached;
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

Assessment

The module will be assessed by

Formative assessment: Tutorial problem sets.

Summative assessment: 100% unseen written exam.

1.1.2 C2 - Fuel Cell Technology

Learning outcomes

Upon completion of the module, the student will be able to:

- Present and criticise the potential, benefits, boundary conditions, and prospects of employing fuel cell and hydrogen technology today and in future markets;
- Describe the Physics, Chemistry and Engineering of fuel cell and hydrogen technologies and be able to apply this knowledge to moderately complex problems;
- Be able to choose appropriate technology when faced with a moderately complex engineering design task;
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets and quizzes.

Summative assessment: 50% individual coursework 7500 word report ,
50% unseen written exam 1 hour.

1.1.3 C3 - Hydrogen and hydrogen-based fuels

Learning outcomes

Upon completion of the module, the student will be able to:

- Present and criticise the methods, potential, benefits, and prospects of hydrogen production, storage and safety handling.
- Understand concepts that relate to Power to Gas and Power to X concepts.
- Describe the Physics, Chemistry and Engineering of hydrogen production and storage technologies and be able to apply this knowledge to moderately complex problems.
- Be able to choose appropriate technology when faced with a moderately complex engineering design task.
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 50% individual 5,000 word study report,
50% 1 hour written unseen exam.

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1.1.4 C4 - Modelling

Learning outcomes

Upon completion of the module, the student will be able to:

- Discuss the mathematical tools that are required to simulate the operation and performances of a fuel cell system, including an overview on the equations to model the fundamental physical phenomena occurring inside the active layers (electrodes and electrolyte) of the electrochemical cell.
- Explain methodological approaches that are required to design and simulate the performance of fuel cell or electrolyser systems.
- Understand the modes of operation of a fuel cell and the operating principle(s) of single components comprised in a fuel cell system.
- Display knowledge on how to perform energy systems analysis of fuel cell systems with a focus on stationary applications.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 50% individual 2,500 word study report,
50% two (2) written class tests (25% each).

1.1.5 C5 - Characterisation methods

Learning outcomes

Upon completion of the module, the student will be able to:

- Inspect and appraise the performance of fuel cells in terms of stability, power output, longevity;
- Plan and design experimental procedures to critically evaluate the operation of fuel cells, catalyst utilisation, electrochemically active catalyst surface area and poisoning;
- Assess and evaluate the different electrochemical concepts including cyclic voltammetry, electrochemical impedance spectroscopy, chronoamperometry to study fuel cells components;
- Compare, differentiate and analyse different material characterisation techniques;
- Evaluate different material properties and requirements (morphology, conductivity, water retention etc) for electrocatalysts, catalyst supports, conducting membranes and other fuel cell components by combining electrochemical and material characterisation.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 100% individual 4,000 word study report.

1.1.6 C6 - Laboratory module

Learning outcomes

Upon completion of the module, the student will be able to:

- Inspect and appraise the performance of fuel cells in terms of stability, power output, longevity.
- Plan and design experimental procedures to critically evaluate the operation of fuel cells, catalyst utilisation, electrochemically active catalyst surface area and poisoning.
- Assess and evaluate the different electrochemical concepts including cyclic voltammetry, electrochemical impedance spectroscopy, chronoamperometry to study fuel cells components.
- Compare, differentiate and analyse different material characterisation techniques.
- Evaluate different material properties and requirements (morphology, conductivity, water retention etc) for electrocatalysts, catalyst supports, conducting membranes and other fuel cell components by combining electrochemical and material characterisation.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 25% class (lab) tests,
25% individual 2,500 word study report,
50% one hour written unseen exam.

1.1.7 C7 - Hydrogen Safety

Learning outcomes

Upon completion of the module, the student will be able to:

- Demonstrate knowledge related to hydrogen properties and hazards and ability to apply this knowledge to hydrogen safety engineering design, including compliance with regulations, codes and standards;
- Evaluate requirements for safety provisions by taking into consideration knowledge on hydrogen releases, ignition, jet fires and material properties;
- Illustrate mastery in analysing complex hydrogen safety problems both systematically and creatively, by integrating fundamental knowledge and engineering approaches from a variety of disciplines;
- Apply self-direction and originality in tackling and solving hydrogen safety problems at a professional or equivalent level.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets and online quizzes,

Summative assessment: 2 x 50% individual 5,000 word study reports.

1.2 Optional modules

1.2.1 O1 - Environmental analysis, life cycle analysis

<u>Learning outcomes</u>

Upon completion of the module, the student will be able to:

- calculate conversion chain efficiencies and cumulative energy for moderately complex systems;
- explain the differences and communalities between global and local emissions;
- discuss issues and approaches of Life Cycle Inventories;
- explain and sketch out the process of Life Cycle Analysis;
- explain and discuss environmental costing approaches.

<u>Assessment</u>

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	75% individual 5,000 word study report, 25% class test.

1.2.2 O2 - Low temperature fuel cells

<u>Learning outcomes</u>

Upon completion, the student will be able to:

- Present and criticise the potential, benefits, boundary conditions, and prospects of employing LT-FC technology today and in future markets;
- Describe the theoretical basis of LT-FC with respect to the electrochemistry and thermodynamics and be able to apply this knowledge to moderately complex problems;
- Be able to choose appropriate technology when faced with a moderately complex engineering design task;
- Select appropriate materials for LT-FC designs and define crucial properties;
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

<u>Assessment</u>

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	100% unseen written exam, 1 hour.

1.2.3 O3 - High temperature fuel cells

<u>Learning outcomes</u>

Upon completion of the module, the student will be able to:

- Present and criticise the potential, benefits, boundary conditions, and prospects of employing HT-FC technology today and in future markets;
- Describe the theoretical basis of HT-FC with respect to the electrochemistry and thermodynamics and be able to apply this knowledge to moderately complex problems;
- Be able to choose appropriate technology when faced with a moderately complex engineering design task;
- Select appropriate materials for HT-FC designs and define crucial properties;
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

<u>Assessment</u>

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 100% unseen written exam, 1 hour.

1.2.4 O4 - Low temperature systems

<u>Learning outcomes</u>

Upon completion of the module, the student will be able to:

- Define, present and explain the structure, main components of an LT-FC system;
- Describe the interaction and interdependencies of system architecture and specific application;
- Be able to calculate fuel and energy flows in the system and estimate system efficiency;
- Select appropriate fuels and fuel processing for the LT-FC design.

<u>Assessment</u>

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 100% individual 7,500 word design study.

1.2.5 O5 – High temperature systems

<u>Learning outcomes</u>

Upon completion of the module, the student will be able to:

- Define, present and explain the structure, main components of an HT-FC system;
- Describe the interaction and interdependencies of system architecture and specific application;
- Be able to calculate fuel and energy flows in the system and estimate system efficiency;
- Select appropriate fuels and fuel processing for the HT-FC design.

Assessment

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	100% individual 7,500 word design study.

1.2.6 O6 - Advanced characterisation

Learning outcomes

Upon completion of the module, the student will:

- Understand and explain advanced chemical and physical characterisation methods;
- Discuss differences between and strengths of the main analysis techniques;
- Choose appropriate characterisation techniques for complex analysis problems.

Assessment

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	30% individual 5,000 word design study, 70% written unseen exam, 1 hour.

1.2.7 O7 - High temperature chemistry for SOFCs/SOECs

Learning outcomes

Upon completion of the module, the student will be able to:

- Understand fuel oxidation chemistry and electrochemistry in high temperature systems,
- Select suitable fuel processing methods, given the requirements,
- Understand the influence of contaminants on electrochemical processes and select suitable gas cleaning/processing routes,
- Be able to evaluate and select high temperature SOFC/SOEC systems and prepare an outline design.

Assessment

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	100% written unseen 1 hour exam.

1.2.8 O8 - Fuel cell electric vehicles

Learning outcomes

Upon completion of the module, the student will:

- Present and criticise the potential, benefits, boundary conditions, and prospects of employing fuel cell vehicles (FCEV) in decarbonising transport and their future market development.
- Describe the design basics of FCEV with respect to the main components, their performance and impacts on overall product and be able to apply this knowledge to moderately complex problems.
- Estimate environmental benefits of FCEV over competing technologies, both incumbent and future developments.
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 100% individual design study 5,000 words.

1.2.9 O9 - Politics, markets, regulation, codes and standards

Learning outcomes

Upon completion of the module, the student will:

- Present and criticise potential, benefits, boundary conditions, and prospects of employing fuel cell and hydrogen technology today and in future markets;
- Be able to identify the politics that will support the introduction of these new technologies in Europe and in the world;
- Be able to identify and find the regulations that have to be followed when developing such technology.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 100% individual study report 5,000 words.

1.2.10 O10 - Energy system and storage

Learning outcomes

Upon completion of the module, the student will be able to:

- Present and criticise the methods, potential, benefits, and prospects of energy system and storage;
- Understanding concepts that relate to the concept of energy vectors;
- Describe the physics, chemistry and engineering of energy storage technologies and be able to apply this knowledge to moderately complex problems;
- Be able to choose appropriate technology when faced with a moderately complex engineering design task;
- Communicate information, concepts, problems and solutions to specialists and non-specialists.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 50% individual study report 2,500 words,
50% written unseen exam, 1 hour.

1.2.11 O11 - Advanced modelling

Learning outcomes

Upon completion of the module, the student will have acquired:

- Know-how on modelling of the fundamental physical phenomena occurring inside the active layers (electrodes, GDE) and separator (electrolyte membrane);
- A solid background in order to design and optimise assembly of fuel cells and electrolysers and diagnose defects.

Assessment

The module will be assessed by

Formative assessment: tutorial problem sets,

Summative assessment: 50% individual study report 2,500 words,
50% class test.

1.3 Additional Modules

Additional modules are offered for the universities running 24-month MSc courses to be able to offer modules to deepen student knowledge in specific areas.

1.3.1 A1 - Electrocatalysis

Learning outcomes

Upon completion of the module, the student will be able to:

- Describe interfacial chemistry and processes on electrode and electrocatalysis phenomena;
- Describe thermodynamics, kinetics laws involved at the interface;
- Characterise electrocatalysis activity and important controlling factors for catalysis design.

Assessment

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	100% study report, 5,000 words.

1.3.2 A2 – Power to Gas Technologies

Learning outcomes

Upon completion of the module, the student will be able to:

- Explain the principles of P2G technologies and the underlying technological principles;
- Understand and discuss the energy infrastructure context and the connection to renewable energy integration;
- Design the outline of a P2G system embedded in a national energy system.

Assessment

The module will be assessed by

Formative assessment:	tutorial problem sets,
Summative assessment:	100% study report, 5,000 words.

2 Teaching methodology

2.1 Online course delivery

The TeacHy educational and teaching material has been sourced from material that was designed for classroom teaching (face-to-face teaching). As per the requirements in place for teaching at the University of Birmingham (UoB), recording of class lessons is compulsory. Therefore all lectures given at UoB are available post-lecture to students for revision via the CANVAS learning management system (LMS). The lectures can be viewed in the form of 'videos' that consist of the visuals as shown during the lecture (including the slide set and any other visuals such as mixed media, visualiser etc.) in real time, underlaid with the voice of the lecturer. In some lecture halls there is an option to fill the black/white board and the lecturer, if required.

The first approach to the TeacHy course will be to use the analogous approach in recording all lectures in real time, using the Panopto recording software available at UoB or other tools, such as the recording tool integrated into the Powerpoint software.

In doing so, a few caveats have to be kept in mind:

- the TeacHy lecture has no context – teacher and student might never have met. Whilst in the UoB context the students normally view the videos for revision and thus have in some way previously interacted with the lecturer, this is now void. Care has therefore to be taken to give students all information through the audio track and the visuals. Care also has to be taken when classroom recordings are adopted for TeacHy use that any student questions, interaction with students etc. will not translate to the LMS audience.
- the usual habit of using a pointer has to be scrapped in favour of using the mouse for pointing at items in the slides. Whilst animation is seen as ambivalent for classroom or conference presentations, these might be essential for LMS delivery.
- visualisers (or overhead projectors) can be used effectively to write as is spoken and involve students more in the creation process of the information provided.

Other than in a lecture, where breaks can be negotiated with the students and/or called when major cesuras offer themselves, this is not evident in web delivery. On the other hand students can stop and pause lectures at any time and insert breaks as they see fit. Nevertheless, it is probably adviseable to cut material into shorter sections than this would be done for classroom delivery. This would allow easier navigation and enable students to view material without breaks, thus making it easier to find the starting point when continuing studies at a later point. On the other hand, it should be avoided to follow the trend to very short videos of 5 to 10 minutes since this does not allow for development of complex and elaborate context.

From the starting point of 'recorded lectures' it quickly becomes clear that a course delivered mainly online has to cater to other needs. In the next step of refining the course and module contents more care should be taken to diversify the teaching material, for instance by including more alternative visual material such as films and also utilising 'serious games' technology (online 3d-simulations). As a first step that is easily installed on an LMS system, online quizzes and additional reading lists can be quickly implemented once the lecture material itself is in place.

2.2 Relativity of learning outcomes and assessment

An important point that has resulted from the discussions around accreditation is the attitude of universities towards their 'own' courses and the approaches taken to assessment. This will impact on the way assessment is performed, but also on the formulation of learning outcomes. This document follows the lines set out at UoB within the framework of course programme development. Learning outcomes are formulated according to post-graduate programme expectations. These might differ under other systems.

The same is true for the assessment criteria. In many countries oral exams are considered a standard assessment procedure and not every module in a course will carry an exam assessment. Under the UK system this is different and oral exams are frowned upon due to a lack of documentation of exam outcomes. Therefore the assessment strategies might vary in other course implementations than the UoB CANVAS one.

In Section 1 an approach has been taken to balance overall student effort and avoid the usual over-stressed UK exam period in May. With a new approach of 'semesterisation', though, UoB is from the academic year 2020/21 splitting the exam period into two, one in January, following the autumn term (now semester), and one in May, following the spring semester. This will reduce exam pressure slightly, since the assessment follows the lectures more immediately, thus avoiding stressful revision for long passed lectures. This schedule might or might not agree with other universities' exam arrangements. Adequate adjustments would have to be made in individual LMS implementations, if required. The online character of the course allows for a lot of flexibility in this respect.

2.3 Languages of delivery

The original project proposal assumed that most countries would wish to deliver at least part of the course in their native language. This approach might not be the most favoured one since an increasing number of universities have begun to deliver courses in English. This has two main reasons: (i) facilitating student employability across global industry, but (ii) also attracting international students. The attractiveness of universities in the U.S.A., Hongkong, and the UK is understood to be based on the universal access to English as a global language. This is something the U.S.A. and UK universities mistake as acknowledgment of quality of teaching. A widespread offer of courses delivered in English at far lower tuition fees than at U.S./UK universities will constitute a major competition challenge.

Whatever the approach of individual universities will be, several approaches to languages have been identified:

1. delivery all in native language – this will require translation of the slides and the audio track;
2. delivery of the audio track in the native language – the slides and visual material would remain in English;
3. delivery of the slides in the native language – the audio track remains in English;
4. delivery of the whole course in English.

Currently the majority of universities seem to vote for approach 2 and 4. Translation of material has therefore been postponed as a low priority. This will most certainly change when transfer to CPD delivery is considered where it may be expected that native language have a higher priority.

3 Definition of roles

In a conventional university context, roles are seldom clearly defined. There is an assumed mutual understanding what everyone has to do and how responsibilities are taken. This is slightly different in England, where students pay high tuition fees. Therefore a development started when the fees were tripled in 2016 where students understand their role as 'customers' and the university is turning into a 'service provider'. Seeing the value of tuition fees (approx. £9,000 per year for undergraduate home students and up to £20,000 per year for international students) it is understandable when a student is upset about low grades. English universities are therefore very much concerned about quality assurance in course delivery than most other universities in Europe. Although quality assurance is certainly a good thing, over-concern with the standard of delivery is also turning into a stifling framework where many elements that should be voluntary and depend on the approach and style of the lecturer, are regulated and increasingly based on compulsory elements.

The take-away message is that the more students are expected to pay in fees (see Deliverable D8.3 on the business model of course delivery) the more attention has to be given to a seamless and stable performance of all LMS functions in order to avoid any negative feedback from the students that could hamper the income generated by the course.

Given that there is little scope for interaction between lecturer and student, e.g. in the way of immediate reaction to questions during a lecture, an online course (or one that is mainly delivered online) will have to pay more attention to detail and technical functionality than a face-to-face course where spontaneous interaction can remedy any hick-ups. Insofar it will be beneficial to clearly define the roles of contributors to the course in order to assign responsibilities and have clear assignments of obligations in delivering the course. This will reduce the amount of effort spent centrally in chasing up actions and overseeing a smooth student experience is obtained.

3.1 Course management

The course material will be centrally managed and developed (see Deliverable D8.3 for post-project arrangements). A Secretariat will hold responsibility for updating the lecture materials by coordinating updates and feedback received with the Content Developers (authors).

The Course Management will support universities wishing to implement the course material on their LMS and in accreditation of the course at individual universities. It will manage the issue of exam papers, again in cooperation with the Content Developers.

This is purely coordinating and facilitating role aimed at keeping the course material at high quality. In return, (license) fees will be collected and distributed to the Authors in return for their continued involvement (see Deliverable D8.3 for further details).

Course Management will act as an external go-to access point for FCH education at graduate and CPD level. It will perform advertising of the course concept, both attracting students and universities, through the various dissemination pathways of the TeacHy project.

3.2 Content developer

Content developers prepare and share the course teaching material according to the curriculum. The teaching content/material will include lecture slides, artwork/diagrams, relevant multimedia content, videos, formative and summative course assessments (tests and exams), as well as ideas for coursework assignments, practical training sessions and project work.

Content developers will also be responsible for internal peer-review of teaching material for quality assurance purposes.

Where applicable, content developers will translate the teaching material (or have it translated and oversee the process) into other languages than English.

With the end of the TeacHy project it is expected that content development will stagnate and furthermore concentrate on updating and improving the existing material as agreed with the Course Management. Nevertheless, arrangements could be made to supply universities with exam papers, since this is a major criterion in course accreditation (who 'owns' the course and the assessment?, see Deliverable 6.1) whilst at the same time carrying a high responsibility in quality (all questions need to be solvable to avoid panic situations during exam sittings) and high work load (exams typically cannot be re-sued within 5 to 10 years and have to be re-developed annually).

3.3 Partnering University

The university wishing to implement the course needs to supply the LMS suitable to host the material or enter an arrangement to access a central repository, including all contractual arrangements.

It needs to accredit the course in one way or the other – if necessary negotiating changes and adaptations with the Course Management. It will independently recruit the students enrolled in its course. Interested students wishing to enrol at a specific Partner University that have been in touch with the Course Management will be passed on accordingly.

It has to

- supply sufficient lecturing capacity to deliver the face-to-face component,
- supply access to the laboratory facilities to deliver module C6 (Lab work), or alternatively enter an agreement with another university to gain access there, or provide for sole delivery of C by remote access through POLITO,
- organise the assessment sessions (exams) and grading of all coursework, study and design reports,
- supply enough capacity to allow all course students to complete their final research project (thesis) that will lead to be granted the grade of MSc.

3.4 Lecturer

The Lecturer is responsible for delivering the course content in an institutional setting. This will regularly be the lecturer delivering the face-to-face part of the course.

The Lecturer will have input from the course material provided by TeacHy – in an ideal setting from notes supplied with the teaching material. There might also be adaptations necessary to fit the course to the individual university programme of teaching requirements. This would be the responsibility of the Lecturer. Input and support will be offered by the Course Management. Modification of modules or lectures is not foreseen but is not wholly impossible. This would occur at the risk of the Lecturer and would have to be accommodated by a respective license granted by the Course Management in order to retain the brand of 'TeacHy course'.

The Lecturer will be the locally responsible for providing the students with adequate information for completing the course assessment(s). The Lecturer will be responsible for grading the course assessment(s) and communicating results and constructive feedback to the students. This might occur with support from the Course Management and Content Developers, pending individual arrangements.

The Lecturer will be expected to obtain feedback from the students using appropriately designed surveys during and at the end of the course for quality control purposes, relaying this back to the Course Management. Teachers could also be tasked with peer-reviewing and updating course content in line with the TeacHy curriculum as necessary for quality assurance.

Where applicable, teachers can take the task of translation of the course content into their respective native language.

3.5 Student

The student trainee is the individual undertaking the course provided by the TeacHy project. The minimum education requirement of the students is a BEng or BSci in science and engineering disciplines. To successfully pass, the student is expected to adequately study the course content and satisfy the many learning objectives. Upon achieving passing grades and demonstrating satisfactory performance throughout the course assessments, the student will be awarded the degree certificate.

As a developing academic, students are expected to be independent and able of organising their studies along the guidance given in the modules. This means organisational capabilities of time management and planning of lecture sequence (since within a module lectures could be taken in any sequence). Students are responsible for revision in preparation of exams and for timely delivery of coursework.

Students are expected to give feedback on their experience and the quality of the teaching material. This is an essential element of course quality assurance and key in continuous improvement of the course offering. Nevertheless, it should be kept in mind that student feedback can be very contradictory and caution is required in following advice or requests offered on feedback forms.