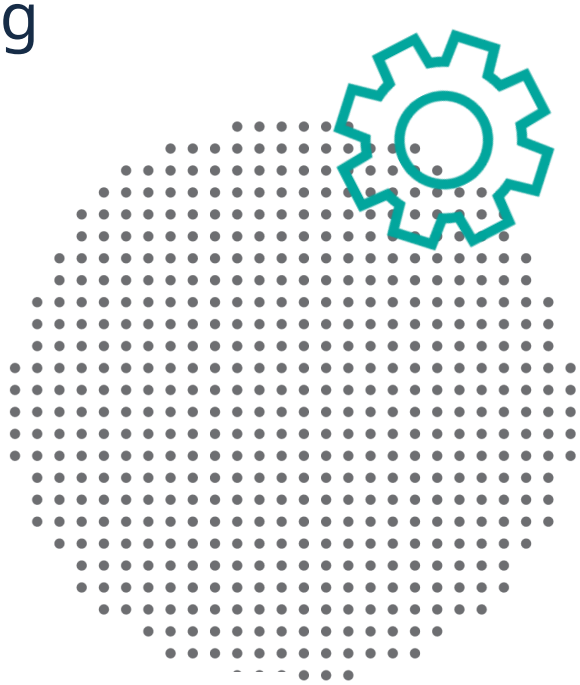
MTU
Ollscoil Teicneolaíochta na Mumhan
Munster Technological University

Host Industry Partner Work Placement Handbook

Bachelor of Engineering (Honours) in Mechanical and Manufacturing Engineering



RETHINKING ENGINEERING EDUCATION IN IRELAND REEdI
UNIVERSITY OF LIMERICK OLLSCOIL LUIMNIGH
HEA HIGHER EDUCATION AUTHORITY AN tÚDARÁS um ARD-OIDEACHAS
HCI Human Capital Initiative

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1. Introduction

The host industry partner work placement handbook provides guidelines on the collaborative approach to work placement. It contains the roles and responsibilities of the host industry partner to ensure a successful outcome to work placement. The detailed student work placement handbook is referenced in Table 13. A copy of this is available through the REEdI website www.reedi.ie.

2. Rethinking Engineering Education in Ireland (REEdI)

The REEdI programme is a Bachelor of Engineering (Honours) in Mechanical and Manufacturing Engineering (programme) which is equally divided between time spent in an academic setting and time spent in industry. The student engineer will spend 2 years at the host industry partner gaining the essential industry skills and personal attributes an employer looks for in a graduate engineer. REEdI is co-designed, co-developed and co-delivered with industry, with the aim of producing workplace experienced graduates for the manufacturing sector.

REEdI will develop well rounded graduate engineers with a balance of competencies around technical skills, transverse skills and soft skills. It will link theoretical learning to its application in the workplace, giving the student engineer exposure to a range of learning experiences in actual industry settings. Student engineers will have the opportunity to interact and collaborate with experienced professionals to develop all the skills that are critical for graduate engineers embarking on a career in engineering.

REEdI serves as a recruitment mechanism with the potential to contribute to the overall development of employment-ready graduates. The REEdI programme provides opportunities for the host industry partner to develop research links and engagement with MTU and partner universities.

Listed in Table 1 are the key benefits of the REEdI programme for the host industry partner and student engineer.

Host Industry Partner	Student Engineer
▪ Graduates are more industry ready after the 2-year work placement, so the time taken to settle into a new industry and job is reduced. ▪ Students take ownership of their own career paths and are therefore highly self-motivated. ▪ Closer industry-university collaboration creates a unique opportunity to develop a pool of potential recruits, with awareness of your organisations culture and processes. ▪ Input into curriculum design, development, delivery and continuous improvement. ▪ An injection of new ideas and fresh perspectives from adaptable and flexible REEdI student engineers. ▪ Develop employees through mentoring students. ▪ A commitment to the profession, by training future professionals. ▪ Establish your organisation as an employer of choice for graduates.	▪ Gain practical experience in a professional industry setting. ▪ Real-world application of knowledge and skills, highlights relevance and helps to reinforce student motivation for learning. ▪ 2-year work placement bridges the gap between college and the workplace. ▪ Develop and build on technical skills, but equally develop essential soft skills and transversal skills. ▪ Development of key interactive attributes, e.g., team working, interpersonal and communication skills. ▪ Accept more responsibility and achieve greater self-reliance in the workplace. ▪ Develop an awareness of workplace culture. ▪ Develop and build greater work ethic. ▪ Assistance in developing career strategies, such as help with career choice, becoming aware of opportunities, and building up a network of contacts.

Table 1 Benefits of the work placement model

3. Work placement roles

Work placement roles are detailed in Table 2.

Role	Organisation	Description
Engineer in Residence / Work Placement Coordinator (Coordinator)	MTU	The Engineer in Residence brings extensive industry experience to the programme. Their role includes, development of the work placement framework, recruitment of host industry partners and coordination of work placement. They support and guide, both the student engineer and host industry partner, through the work placement process and are the primary link between host industry partners and the academic team. The Engineer in Residence delivers academic content and participates in the assessment of the student engineers work placement.
Work Placement Academic Tutor (Academic Tutor)	MTU	An academic staff member appointed by MTU as tutor and assessor of a student engineers work placement. The work placement academic tutor will be a member of the academic staff and will have academic oversight of the work produced by the student engineer.
Student Engineer (Student)	MTU	Student taking part in the work placement.
Work Placement Mentor (Mentor)	Host Industry Partner	A staff member of the host industry partner, appointed by the host industry partner, to supervise the student engineer during their work placement. This person is the primary host industry partner contact for the duration of the student's work placement. This individual may differ where multiple students are hosted by a host industry partner.
Host Industry Partner (Industry Partner)	Host Industry Partner	Industry partner that is offering work placement positions within their company.

Table 2 Description of work placement roles

4. Work placement application process

The process to place a student engineer with a host industry partner is detailed in Figure 1. An important event, which is the first opportunity for engagement, will be the engineering symposium. This is an event developed to showcase the students and their projects to industry partners. Industry partners can engage with students at the event

and have formal or informal discussion about work placement. The engineering symposium will be held in the second year of the student's programme.

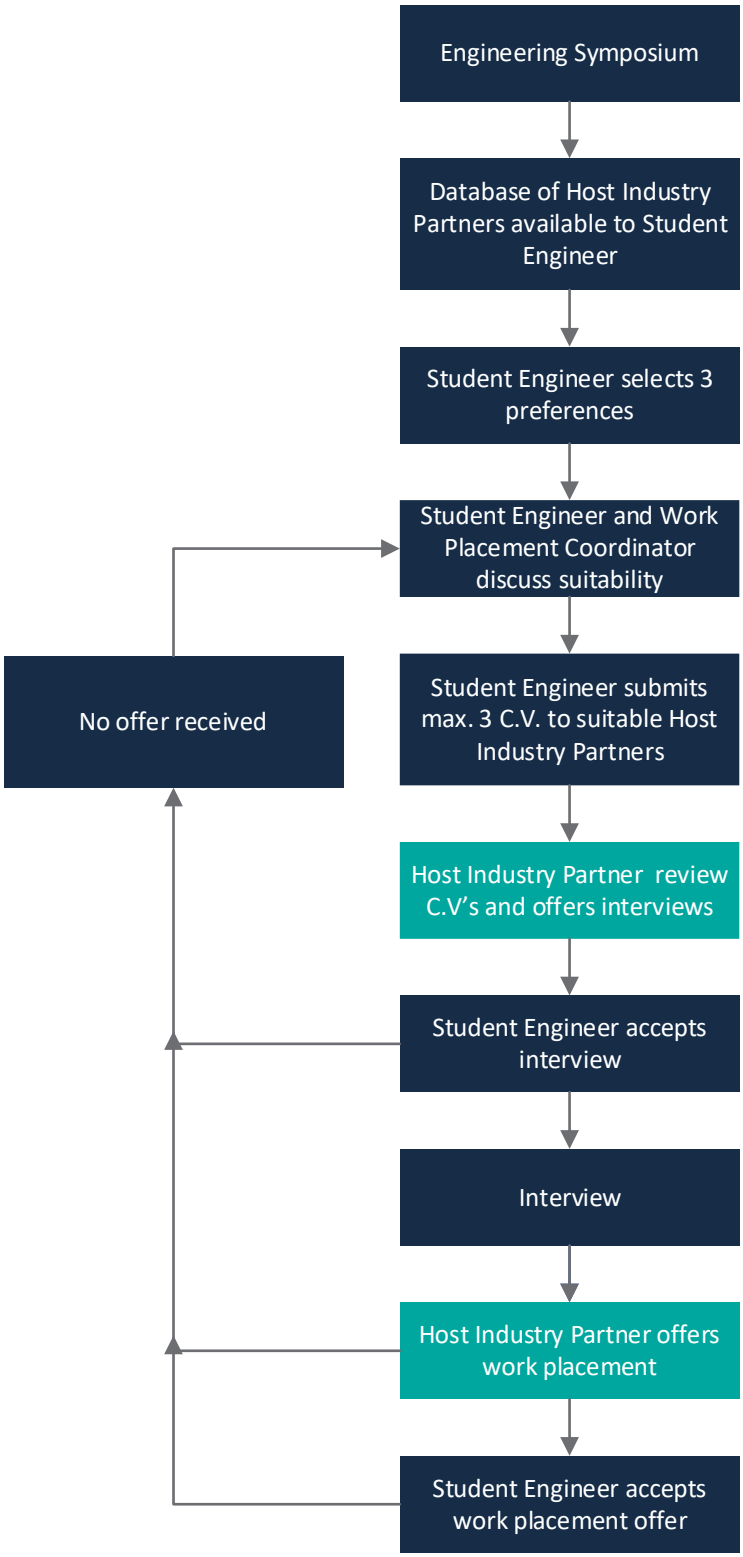

Figure 1 Work placement application process flow

5. Student engineer work placement workshop

Prior to the student engineer progressing to work placement, they are required to complete a work placement workshop at MTU. The purpose of this workshop is to ensure the student is best prepared for the upcoming challenges of industry. The following topics will have been covered through engineering challenges and transverse skill modules in year 1 and year 2, but this workshop will act as a refresher to crystalise these concepts before embarking on work placement.

- Willingness to learn.
- Communication skills.
- Organisational skills.
- Creative thinking and problem solving.
- Flexibility and initiative.
- Professional expectations and competencies.
- Reflective practice
- ePortfolio – Linking learning outcomes to work placement tasks.
- Guidance on confidentiality.
- Useful templates for projects and reporting.

6. Terms of work placement

The schedule and terms of the work placement for the programme are detailed in Table 3.

Work Placement	Academic Semester	Programme year	Industry days / week	Academic days / week	Industry hours / week	Academic Term
1	Semester 5	3	4	1	28 to 32	Sept. → Dec.
2	Semester 6	3	4	1	28 to 32	Jan. → Jun. (see note)
3	Semester 7	4	4	1	28 to 32	Sept. → Dec.
4	Semester 8	4	4	1	28 to 32	Jan. → Jun.

Table 3 Terms of work placement

Note:
The host industry partner has the option to retain the student for the period June to September, if agreed by all parties. This is an agreement outside of the remit/ scope/ supervision of MTU. If the student is retained for this period, they are available to work 5 days per week.

- The student will spend 1 day per week (8 hours paid or unpaid, this is at the discretion of the industry partner) completing 2 academic modules. Prior to commencement of the work placement, it should be agreed between the industry partner, student and MTU how this 8-hour block is structured.

- Salary should be discussed and agreed before the work placement. The team aim to benchmark work placement salary in the future.
- Any divergence from these conditions must be agreed on by the industry partner and MTU in a work placement variation agreement, see Table 12.

7. Work placement mentor selection

Nomination of a suitable work placement mentor is critical to the success of the work placement, for the student engineer, work placement mentor, host industry partner and MTU. Nominating a mentor should be seen as an opportunity for development of employees through mentoring a student.

The industry partner must appoint a mentor for each student. The industry partner is responsible for ensuring that the candidate has the required experience and has the required bandwidth in their work schedule to fulfil the role of mentor successfully. If the mentor is changed for any reason, a mentor, with the same experience, must be assigned as a replacement. The student must notify MTU immediately of this change, to ensure all relevant documentation is updated.

Once the student has agreed to join the industry partner and the mentor has been selected, there will be a work placement mentor workshop to introduce them to the programme, inform them of the resources available and to prepare them for the role. This workshop may take the form of in person training, online training, or pre-recorded training with support material online, see Table 13. Mentorship training will be part of the students engineering challenge & transverse skills module. This content will be made available via an online platform to mentors if they wish to access it.

It is recommended that the mentor has a level 7 qualification, or equivalent, in a related area with a minimum of 2 years industry experience. Table 4 summaries these details.

<table>
<tr><th>Work Placement</th><th>Programme year</th><th>Minimum Qualification</th><th>Minimum Industry Experience</th></tr>
<tr><td>1</td><td rowspan="2">3</td><td rowspan="4">Level 7</td><td rowspan="2">2 years</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td><td rowspan="2">4</td><td rowspan="2">3 years</td></tr>
<tr><td>4</td></tr>
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Table 4 Work placement mentor minimum qualifications and experience

8. Work placement mentor roles and responsibilities

The work placement mentor should be the first point of contact for the REEdI student engineer for all topics relating to the work placement. Table 5 defines the roles and responsibilities of the mentor.

Mentor Roles and Responsibilities	Interval	Description
Student point of contact	Daily	Point of contact for the student engineer in the host industry partner.
Daily task assignment	Daily	Assign daily tasks.
ePortfolio review and signature	Bi-weekly	Review and digital signature of student engineers ePortfolio to ensure they are recording what they have been working on.
Work placement coordinator meeting	4 weeks	Meeting every 4 weeks with the work placement coordinator to discuss the ePortfolio contents.
Ensure training completed	Once per semester	Ensure all training relevant to the student engineer's role is completed, including induction training.
Performance Appraisal	Once per semester	End of semester performance appraisal.
Oral Presentation	Once per semester	Attend student engineer oral presentation at the end of each semester.

Table 5 Work placement mentor roles and responsibilities

9. Learning objectives

The programme will develop well rounded graduate engineers with a balance of competencies around technical skills, transverse skills and soft skills.

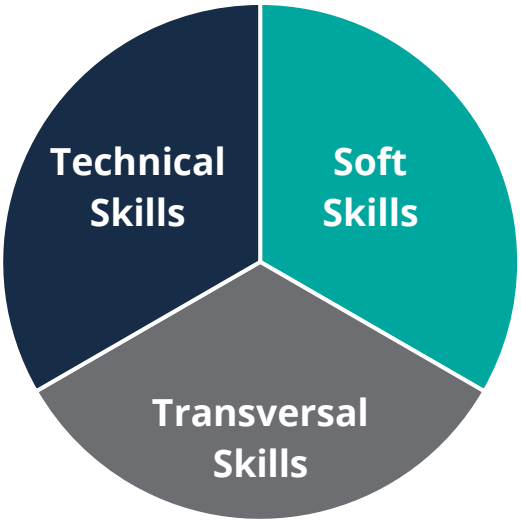

Figure 2 Skills development

To strike this balance the learning objectives for work placement will cover competencies in these 3 equally weighted areas in Table 6.

Technical Skills	Soft Skills	Transversal Skills
Mechanical Engineering	Project Management	Self-Awareness*
Manufacturing Engineering	Presentation Skills	Communication
Quality Engineering	Problem Solving	Teamwork
Automation Engineering	Time Management	Influencing Others
Materials Engineering	Organisational Skills	Conflict Management

Table 6 Learning objectives

To demonstrate that student engineers are developing competencies in all these key areas, they are required to gather documented evidence in their ePortfolio, throughout their work placement and specify how it demonstrates relevance.

*Self-Awareness will be captured separately through a reflective journal.

Table 7 is a generic description of the learning outcomes for each work placement and how the learning outcome expectation develop as the work placement progresses.

Work Placement	Level	Learning Outcome
1	7	Build on **PRIOR** Knowledge & Skills (i.e. What) Understand Relevance on **PRIOR** Knowledge & Skills (i.e. Where, When and Why) Apply **PRIOR** Knowledge & Skills (i.e. How)
2	7	
3	8	Develop **NEW** Knowledge & Skills (i.e. What) Understand Relevance on **NEW** Knowledge & Skills (i.e. Where, When and Why) Apply **NEW** Knowledge & Skills (i.e. How)
4	8	

Table 7 Learning outcomes

A detailed table of the learning outcomes for the work placement modules are in Appendix A.

10. Work placement assessment strategy

The student engineer will be assessed during each semester of work placement. They will be assessed by reflective journal, ePortfolio and performance appraisal. The student will have experienced these assessment methods during semester 1 to 4, before they begin work placement. Table 8 details each assessment method, assessment weighting and person responsible for assessing.

Assessment Method		Description	Grading		Assessor	WP1	WP2	WP3	WP4
						15 Credits	15 Credits	15 Credits	15 Credits
Reflective Journal		The student engineer keeps a weekly journal of reflections on challenges, opportunities, successes and setbacks. Each reflection is descriptive, shows development of knowledge and meaning and outlines a plan of action. The reflective journal will be on an e-learning platform.	30%		Work Placement Coordinator / Academic Tutor	✓	✓	✓	✓
ePortfolio	**Work Placement Logbook**	A collection of technical documentation that shows evidence of the student's progress, development, and achievement of learning outcomes during work placement.	70% - WP 1 80% - WP2, WP3, WP4	50%	Work Placement Coordinator / Academic Tutor	✓	✓	✓	✓
	Oral presentation	Presentation made to work placement mentor, work placement coordinator and work placement academic tutor. The presentation is based on the work tasks completed during the semester.	20%			✓	✓	✓	✓
	Group Discussion Forum	The student must communicate with their class peers on their individual work placements and industry sectors. A framework document will be provided by their work placement coordinator.	10% - WP1			✓	×	×	×
Performance Appraisal		The marks for this assessment method are awarded on a pass or fail basis. The outcome is decided based on the level and quality of the student's engagement with the process steps outlined below. 1. Academic tutor defines competency-based goals for the student. 2. Student provides evidence to demonstrate their achievement of the goals and completes a self-appraisal. 3. Work placement mentor completes an appraisal of the student. 4. Work placement coordinator reviews both appraisals and provides the student with feedback to support them in addressing performance gaps. The performance appraisal process will be supported by a rubric which describes the expected performance level and set of demonstrable characteristics and skills for each competency. An additional rubric will be used to set the pass/fail criteria for the level and quality of engagement.	20%		Work Placement Coordinator / Academic Tutor	✓	✓	✓	✓

Table 8 Work placement performance evaluation

Reflective Journal
The student keeps a weekly journal of reflections on challenges, opportunities, successes and setbacks. Each reflection is descriptive, shows development of knowledge and meaning and outlines a plan of action. The reflective journal will be on an e-learning platform.

ePortfolio
The ePortfolio will be on an e-learning platform. The ePortfolio is made up of the following elements

- **Work Placement Learning Log/Report:** A collection of documentation that shows evidence of the student's progress, development, and achievement of learning outcomes.
- **Oral presentation:** Presentation made to work placement mentor, work placement coordinator and work placement academic tutor. The presentation is based on the work tasks completed during the semester.
- **Group Discussion Forum:** The student must communicate with their class peers on their individual work placements & industry sectors. A framework document will be provided by their EIR mentor.

Performance Appraisal
The marks for this assessment method are awarded on a pass or fail basis. The outcome is decided based on the level and quality of the student's engagement with the process steps outlined below.

- Academic tutor defines competency-based goals for the student.
- Student provides evidence to demonstrate their achievement of the goals and completes a self-appraisal.
- Work placement mentor completes an appraisal of the student.
- Work placement coordinator reviews both appraisals and provides the student with feedback to support them in addressing performance gaps.

The performance appraisal process will be supported by a rubric which describes the expected performance level and set of demonstrable characteristics and skills for each competency. An additional rubric will be used to set the pass/fail criteria for the level and quality of engagement.

11. Work placement projects

The student engineer is required to complete 4 project modules during work placement. Each project module is worth 5 credits. These are detailed in Table 9. The host industry partner can have project subjects already identified for the student. If not, projects should be scoped out by the student and proposals discussed with both the work placement mentor and the work placement coordinator. These should be linked to the industry partners industry.

Project Modules	Description	Grading	Assessor	WP1	WP2	WP3	WP4
				5 Credits	5 Credits	5 Credits	5 Credits
Project Skills	The module will combine skills already acquired in the course and develop new skills to enable the student apply research methods to scope out a potential industry project.	100%	Work Placement Coordinator / Academic Tutor	✓	×	×	×
Research Project	The aim of this project is to use the methods attained in the Research Methods module to implement a research project in the workplace. The module requires the learner to develop, implement and critically assess a detailed methodology to address a defined problem within a prescribed timeframe	100%	Work Placement Coordinator / Academic Tutor	×	✓	×	×
Capstone Project Phase 1	The aim is to provide an opportunity for the student to undertake a capstone project and apply their experience from research project in work placement 1 and 2.	100%	Work Placement Coordinator / Academic Tutor	×	×	✓	×
Capstone Project Phase 2	The aim is to provide an opportunity for the student to continue with the capstone project and apply their experience from capstone project phase 1 and work placements 1,2 and 3.	100%	Work Placement Coordinator / Academic Tutor	×	×	×	✓

Table 9 Work placement projects

During the work placement mentor workshop, see Table 11, there will be further details provided on procedures of scoping and selecting projects. A detailed table of the learning outcomes for the project modules are in Appendix B.

12. Code of conduct

Student engineers are expected to act within the terms and conditions of employment laid down by the host industry partner and should conform to their rules, policies, and practices. Rules and discipline may vary between industry partners, but certain conduct is common practice.

- Punctuality
- Courtesy

- Tolerance
- Good personal hygiene
- Adhere to the dress code of the host industry partner
- Email etiquette
- Internet usage
- Person mobile phone usage
- Time keeping
- Confidentiality

Students are also expected to act within the terms and conditions of the MTU Student Code of Conduct and General Discipline Policy. See Table 13 for link.

Students should approach their work with diligence & integrity and must take responsibility for the work that they are assigned, while displaying a willingness to use initiative. Students are required to sign a work placement code of conduct, see Table 12.

13. Non-completion of work placement

If expected outcomes for work placement programme are not being met, then action should be taken to ensure a constructive outcome is achieved for all parties. Any issue the work placement mentor has with the suitability, performance or conduct of the student engineer should be addressed immediately. Ideally, issues should be resolved between the two parties without need for escalation. This should take the form of regular informal discussions where any problems or concerns from both parties can be discussed. If resolution cannot be found, then there should be engagement between the work placement mentor and the work placement coordinator to find a constructive outcome. See Table 11 for contact details.
The host industry partner has the right to terminate the employment at any time. It is recommended that this is done in consultation with the coordinator, mentor and the student. The termination of work placement form should be completed, see Table 12.

14. Health and safety

It is the responsibility of the host industry partner to train the student engineer in all relevant health and safety procedures and practices applicable to the role assigned to them. The student must adhere to all the health & safety requirements of the industry partner and must take reasonable care of their own health and safety and the health and safety of other people, who may be affected by their actions.

The industry partner should consider allowing students attend in-house approved training days including first aid training, CPR training, manual handling, environmental training and any other relevant training that is of mutual benefit to industry partner & student.

15. Confidentiality

One of the main mechanisms by which student engineers on work placement demonstrate their attainment of skills and knowledge is through the sharing of work-related material. Student data, results and findings while on work placement must be made available to work placement coordinators and work placement academic tutors for assessment purposes.

It is the obligation of the host industry partner to clearly advise the student of any confidentiality issues related to the organisation prior to commencing work placement. This may be in the form of a confidentiality agreement signed by both industry partner and student. Students must get prior approval from the industry partner before they share any commercially sensitive information. Material shared will only ever be used internally at MTU for assessment purposes. Students must respect confidentiality following the completion of work placement.

16. Insurance

See "Code of Practice" document, heading 4.8 and 4.9 (www.reedi.ie).

17. Programme key dates

Table 10 contains key dates for the student engineer work placement.

Key dates	Semester	Date
Student engineer intake	1	September Academic Year 1
Engineering symposium	3	Academic Year 2
Student engineer work placement selection process	4	Academic Year 2
Student engineers enter work placement	5	September Academic Year 3
Student engineer work placement 1 assessment	5	December Academic Year 3
Student engineer work placement 2 assessment	6	May Academic Year 3
Student engineer work placement 3 assessment	7	December Academic Year 4
Student engineer work placement 4 assessment	8	May Academic Year 4

Table 10 Programme key dates

18. Work placement contact

List of contacts within MTU for the host industry partner / work placement mentor to contact.

Contact name	Position	Role	Email
Ivan Morris	Engineer in Residence	Work placement coordinator	ivan.morris@mtu.ie
Katherine O'Sullivan	Engineer in Residence	Work placement coordinator	katherine.osullivan@mtu.ie
Niall Fitzgerald	Engineer in Residence	Work placement coordinator	niall.fitzgerald@mtu.ie

Table 11 Work placement contacts

19. Forms and templates

Form	Name	Format	Description
Form A	Work placement information	Learning Experience Platform (LXP).	Completed by student to log work placement contacts and details.
Form B	REEdI work placement code of conduct	LXP	Should be signed by the student engineer before they go on work placement
Form C	Performance Appraisal	Review Platform	Performance Appraisal carried out once per semester.
Form D	Work placement variation agreement	LXP	Log any changes from the original work placement terms. Conditions must be agreed on by the host industry partner and work placement coordinator.
Form E	Termination of work placement	LXP	Document reasons for termination of work placement.
Template A	Student engineer oral presentation template	LXP	End of semester oral presentation.
Template B	Reflective journal template (LXP)	LXP	Template on the learning experience platform (LXP).
Template C	Level 7 project template / guidelines	LXP	Project and report structure.
Template D	Capstone project level 8 template / guidelines	LXP	Project and report structure.

Table 12 Forms and templates

20. Resources

Resource	Description
Work placement mentor workshop	www.reedi.ie
MTU Contacts	Table 11
Industry Handbook	www.reedi.ie
Industry Brochure	www.reedi.ie
Student Handbook	www.reedi.ie
Student Brochure	www.reedi.ie
REEdI website	www.reedi.ie
MTU website	www.mtu.ie
Forms and templates	Table 12
BEng in mechanical and manufacturing engineering	http://www.mtu.ie/
MTU Student Code of Conduct and General Discipline Policy	https://www.ittralee.ie/en/InformationAbout/QualityAssurance/

Table 13 Resources for host industry partner and work placement supervisor

21. Glossary

Terms	Description
Host Industry Partner (Industry Partner)	Industry partner that is offering work placement positions within their company.
Work Placement Mentor (Mentor)	Employee of the host industry partner, assigned to mentor the student engineer.
Work Placement Coordinator (Coordinator)	A staff member of the programme team appointed by the MTU for the purpose of co-ordinating work placement.
Work Placement Academic Tutor (Academic Tutor)	Academic staff member appointed by MTU as tutor and assessor of student engineers work placement.
Student Engineer (Student)	Student of the programme.
Work Placement	The time the student engineer spends working in industry.
Semester	Academic term, usually 12 weeks in duration.
Engineering Symposium	Event organised to showcase student engineer's and their academic projects from semester 1 to 4.
Reflective Journal	Journal of reflections on challenges, opportunities, successes, and setbacks. Each reflection is descriptive, shows development of knowledge and meaning, and outlines a plan of action.
Learning Experience Platform (LXP)	Online tool where all course content and the ePortfolio is hosted.
ePortfolio	A collection of documentation that shows evidence of the student's progress, development, and achievement of learning outcomes.

Table 14 Glossary of terms used in REEdI program

22. Acronyms

Acronyms	Description
REEdI	Rethinking Engineering Education in Ireland
CoP	Code of practice
REEdI-WoT	REEdI Ways of thinking
WPL	Workplace learning
WIL	Work integrated learning
EIR	Engineer in residence
MTU	Munster Technological University
LO	Learning outcomes
PPE	Personal protective equipment

Table 15 Acronyms

Appendix A

The learning outcomes (LOs) must be at accredited to minimum QQI Level 7 (semester 5 & 6) in work placement 1 & 2 and QQI level 8 (semester 7 & 8) of work placement 3 & 4. While the student engineer must meet the LOs of QQI level 7 in work placement 1 & 2, MTU will not offer level 7 accreditation should the student leave after work placement 1 & 2. MTU is the accrediting body for the undergraduate degree at QQI level 8. The LOs of Engineers Ireland will also be cross referenced for Associate Engineer standard in work placement 1 & 2 and Chartered Engineer with further learning standard in work placement 3 & 4. Furthermore, the LOs for both work placement years will be linked to UNSDGs, Blooms Taxonomy & REEdI Ways of Thinking.

Learning Outcomes				
Learning Outcome	**Work Placement 1**	**Work Placement 2**	**Work Placement 3**	**Work Placement 4**
1	Demonstrate use of reflective practice in the workplace.	Demonstrate use of reflective practice in the workplace.	Reflect critically demonstrating the development of their industry learning.	Reflect critically on learning experience resulting from the work placement.
2	Integrate existing and new technical knowledge for industry applications.	Apply industry tools and techniques acquired during the programme of study and work placement to ongoing industry tasks.	Apply skills and competencies gained during the course and work placement to solve complex engineering issues in the workplace.	Critically analyse and solve complex, real-world engineering problems in industry.
3	Justify a course of action in a work situation e.g., Conflict Resolution.	Effectively communicate the workplace status and identify improvement(s) to their workplace supervisor and mentor.	Communicate and articulate their workplace tasks, outcomes, issues, next steps, in a professional manner.	Appraise and communicate their workplace tasks, outcomes, issues, next steps and innovative ideas in a professional manner.
4	Communicate effectively as an individual and within a team.	Engage in multi-disciplinary team(s) to address company issues and accept responsibility for tasks.	Demonstrate initiative and interpersonal skills and contribute effectively to a multi-disciplinary workplace team.	Demonstrate initiative and leadership skills whilst working alone and in teams.
5	Analyse data in the workplace and suggest new ideas or improvements.	Perform statistical design of experiments and interpretation of results for purpose of product/process improvements.	Apply immersive technologies and lean concepts for continuous improvements in the workplace.	Critically assess the need for product and/or process innovation to solve complex engineering issues.
6	Appreciate the ethical and sustainability guidelines along with health and safety and environmental policies of the organisation	Manage personal responsibility for the ethical and sustainability guidelines along with health and safety and environmental policies in their own department	Comply with ethics and, sustainability guidelines, along with health and safety and environmental policies when performing industry tasks across the organisation	Evaluate ethical and sustainability challenges along with health and safety and environmental concerns associated with a particular task or area in the workplace
7	Engage in a group discussion with their class peers regarding their industry experience.	Recognise the competence required in a group to present a coherent, technical and accurately referenced report regarding their work placement.	Justify critical choices in the planning and implementation of innovative ideas and critique with peers and supervisors.	Justify critical choices in the planning and implementation of innovative ideas and critique with peers and supervisors.
8	Interpret the various roles and department structures within the organisation by creating a flowchart.	Evaluate the benefits and limitations of immersive technologies in the workplace.	Assess the commercial implications associated with implementation of innovative technology e.g., AR/VR in their organisation.	Evaluate financial impacts of any proposed improvement methodologies in the organisation.

Table 16 Work placement learning outcomes

Appendix B

Project Module Learning Outcomes				
Learning Outcome	**Research Skills**	**Research Project**	**Capstone Project Phase 1**	**Capstone Project Phase 2**
1	Evaluate the role of fundamental research in engineering, differentiating between the concepts of research, design and development.	Implement a project, managing the resource requirements, and the timescales involved.	Prepare project plan with timing, tasks, resource management and risk assessment.	Manage project tasks, timing, key deliverables and milestones.
2	Investigate potential integration of immersive technologies to improve a process or design in industry.	Display initiative, analysis and problem-solving skills in developing a detailed, viable methodology to implement the improvement project in the workplace.	Evaluate the existing literature available and draw inferences from same within a practical industry context.	Specify a range of engineering solutions and contribute to their analysis, selection and implementation for complex engineering problems.
3	Scope potential project ideas for supervisor to approve.	Recognise ethics along with health and safety and environmental impacts when carrying out research.	Evaluate and select the appropriate research method for gathering empirical data relevant to the problem/issue under investigation.	Recognise ethics along with health and safety and environmental impacts when developing projects.
4	Define a project plan outlining specific tasks, milestones and deliverables.	Critically assess the outcome against, among other things, appropriate design, immersive technology, safety, commercial and ethical criteria.	Identify areas where immersive technology and/or lean engineering would create efficiencies within industry.	Analyse data gathered and to draw appropriate conclusions and recommendations based on that data.
5	Clearly demonstrate the ethical considerations of research including referencing and the implications of plagiarism on their work.	Deliver a technical and accurately referenced report regarding their project.	Synthesise information gathered to resolve industry issues or challenges.	Articulate concisely and present the findings and conclusions informed by academic writing standards.
6	Effectively communicate the project status - both verbally and in writing.	effectively communicate the project status - both verbally and in writing.	Conduct financial analysis and feasibility studies of engineering projects, including presenting proposals for alternative solutions.	Appraise project outcomes and identify gaps for future research.

Table 17 Project learning outcomes