UNSW Engineering

Final IT Report Instructions & Marking Rubric

The Final Industrial Training (IT) Report is the final step to completing your Industrial Training requirements for an accredited UNSW Engineering degree. The purpose of the report is for you to:

1. Demonstrate that you have attained one or more elements of competency in Engineers Australia's Stage 1 Competencies and Elements of Competency for Professional Engineers.
2. Reflect and connect your experience and learning at the workplace with academic knowledge at university. You must complete all three sections (i.e. Part A, Part B and Part C) of the Final IT Report according to the instructions below.
3. The report should be written in first-person perspective, e.g. "I completed drawings of a building" or "I was responsible for performing a set of calculations".

Marking

<table>
<tr><td rowspan="3">A marking rubric will be used to assess the report.</td><td>To pass your Final IT Report, you must achieve:</td></tr>
<tr><td>- rating of at least 8 for Part A & Part B</td></tr>
<tr><td>- rating of at least 5 for Part C</td></tr>
<tr><td colspan="2">Your marker will ADD 5 points to your grade as verification when you have achieved this, so that the passing grade is 18 (8+5+5).</td></tr>
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Report Instructions

- In **Part A: Description of Placements**, you are to provide the following information per placement:
  a) Provide the following information per placement:
    - Name of each company or institution you were placed with and the title of your position
    - The date and duration of each placements
    - A brief description of the company's or institution's core business or function
    - A brief description of your role and responsibilities
  b) Refer to the marking rubric for Part A: Description of Placement
  c) Maximum 300 words per placement

- In **Part B: Indicators of Attainment**, you are to provide the following per placement:
  a) From the Engineers Australia Stage 1 Competencies and Elements of Competency document, select 3 or more indicators of attainment listed under: -
    - Table 1 Knowledge and Skill base (at least 1)
    - Table 2 Engineering Application Ability (at least 1)
  b) Provide specific examples of how the task or role undertaken by you during your placement exemplifies each indicator of attainment
  c) Refer to the marking rubric for Part B: Indicators of attainment
  d) Maximum 300 words per indicator of attainment

- In **Part C: Reflection on Learning and Workplace Experience**, you are to provide the following:
    - Write a reflection that compares and contrasts what you have learned at UNSW with your experiences as an engineer in the workplace
    - Refer to the marking rubric for Part C: Reflection on Learning and Workplace Experience for examples
    - Maximum 1,500 words for Part C

- **Appendix**, you are to include all of your Employer Evaluation Forms in the appendix of your report.
  a) The Employer Evaluation Forms must total 60 days
  b) Have been signed off by your placement supervisor

Marking Rubric for Part A: Description of Placement & Part B: Indicators of Attainment

Rating	4	3	2	1
Demonstrate attainment of Engineers Australia's Stage 1 Competencies	Provide information about role undertaken, and specific examples of tasks that were performed during each industrial placement. The examples provided clearly exemplify <u>multiple</u> indicators of attainment from Table 1 <u>and</u> Table 2 of Engineers Australia's Stage 1 Competencies document, , with at least 5 Indicators of Attainment in total.	Provide information about role undertaken, and specific examples of tasks that were performed during each industrial placement. The examples provided clearly exemplify <u>at least one</u> indicator of attainment from Table 1 <u>and</u> Table 2 of Engineers Australia's Stage 1 Competencies document, with at least 4 Indicators of Attainment in total.	Provide information about role undertaken, and specific examples of tasks that were performed during each industrial placement. The examples provided clearly exemplify <u>at least one</u> indicator of attainment from Table 1 <u>and</u> Table 2 of Engineers Australia's Stage 1 Competencies document, with at least 3 Indicators of Attainment in total.	Provide information about role undertaken, and specific examples of tasks that were performed during each industrial placement.
Transfer Adapts and applies engineering skills, abilities, theories, or methodologies gained in one situation to new situations	The provided examples demonstrate the student's abilities to **adapt and apply** engineering skills, abilities, theories, or methodologies to **unfamiliar situations** during the industrial placement and **solve difficult and interlinked problems or explores complex issues in original ways**.	The provided examples demonstrate the student's abilities to **adapt and apply** engineering skills, abilities, theories, or methodologies to **familiar situations** during the industrial placement and **solve difficult and interlinked problems or explores complex issues in original ways**.	The provided examples demonstrate the student's abilities to **apply** engineering skills, abilities, theories, or methodologies to **familiar situations** during the industrial placement and **solves a problem or explores an issue**.	The provided examples demonstrate the student's abilities to **apply** engineering skills, abilities, theories, or methodologies to a **familiar situation** during industrial placement and **contributes to the understanding of a problem or an issue**.
Integrated Communication	Completes the industrial training report in the required format. The example is written in a manner that **connects accurately and explicitly** the role undertaken and the tasks that were performed during each industrial placement, with the indicators of attainment.; i.e. the student has a good awareness of the report's purpose and audience.	Completes the industrial training report in the required format. The example is written in a manner that **connects accurately and in a basic way** the role undertaken and the tasks that were performed during each industrial placement, with the indicators of attainment.	Completes the industrial training report in the required format. The example is written in a manner that **connects in a basic way** the role undertaken and the tasks that were performed during each industrial placement.	Completes the industrial training report in the required format.

Association of American Colleges and Universities. (2009). *Integrated and Applied Learning Value Rubric.* Retrieved from https://www.aacu.org/value/rubrics/integrative-learning

Marking Rubric for Part C: Reflection on Learning and Workplace Experience

Rating	4	3	2	1
Connections to Experience Connects industrial placement experience and academic knowledge	**Compares and contrast** industrial placement experiences and academic knowledge, and **illuminate** differences, as well as similarities, between the former and the later. The student also demonstrates **deep understanding** of fields of study and broaden own points of view due to the industrial placement experiences. e.g. At university I had group-based assignments. During my industrial placement at PSI, I was a member of an international team that consisted of a PhD student and his supervisor, who were both Swiss-German physicist, and two engineers from France and Italy. A key difference between group-based assignment at university and teamwork in the workplace is the composition of my team members. At university, my group consists of my classmates only. My team at the workplace composed of individuals from different disciplines and age groups (21 to 45) and cultural background. Working in a multi-discipline team made me realised how a team that possess a wide range of professional competencies is more fully equipped to meet a wide range of challenges, and how good communication is essential to the success of the team. I had to write a research plan in one of my course (CEIC4002) after my industry placement, I realised how a well written research plan can serve as an effective	**Compares and contrast** industrial placement experiences and academic knowledge, and **illuminate** differences, as well as similarities, between the former and the later. e.g. At university I had group-based assignments. During my industrial placement at PSI, I was a member of an international team that consisted of a PhD student and his supervisor, who were both Swiss-German physicist, and two engineers from France and Italy. A key difference between group-based assignment at university and teamwork in the workplace is the composition of my team members. At university, my group consists of my classmates only. My team at the workplace composed of individuals from different disciplines and age groups (21 to 45) and cultural background. Working in a multi-discipline team made me realised how a team that possess a wide range of professional competencies is more fully equipped to meet a wide range of challenges, and how good communication is essential to the success of the team.	**Compares** industrial placement experiences and academic knowledge, and **infer** differences, as well as similarities, between the former and the later. e.g. At university I had group-based assignments. During my industrial placement at PSI, I was a member of an international team that consisted of a PhD student and his supervisor, who were both Swiss-German physicist, and two engineers from France and Italy. A key difference between group-based assignment at university and teamwork in the workplace is the composition of my team members. At university, my group consists of my classmates only. My team at the workplace composed of individuals from different disciplines and age groups (21 to 45) and cultural background.	**Identifies** connections between industrial placement experiences and academic knowledge at a superficial level. e.g. At university I had group-based assignments. During my industrial placement at PSI, I was a member of an international team that consisted of a PhD student and his supervisor, who were both Swiss-German physicist, and two engineers from France and Italy.

	communication tool for setting and prioritising goals, as well as define the roles and responsibilities of each team member.			
Reflection and Self-Assessment Demonstrates a developing sense of self as a learner, building on prior experiences to respond to new and challenging contexts (may be evident in self-assessment, reflective, or creative work) Part C Reflection on Learning and Workplace Experience	**Evaluates** changes in learning before and after each industrial placement, recognizing complex contextual factors (e.g. works with ambiguity and risk, deals with frustration), **demonstrate self-awareness** and **envisions** a future self or **develop** plans that build on experiences or learnings from each industrial placement. e.g. Working in a team during my industrial placement made me realise how I was unprepared for it. At university, my lecturer had stressed the importance of good communication in group work, but I was never taught or made aware of what good communication in a team setting actually entails. For example, I frequently wrote emails that had incomplete information. In the future, I will make an effort to learn how to communicate more effectively and professionally, starting with taking a course on business communication in March.	**Evaluates** changes in learning before and after each industrial placement, recognizing complex contextual factors (e.g. works with ambiguity and risk, deals with frustration). e.g. Working in a team during my industrial placement made me realise how I was unprepared for it. At university, my lecturer had stressed the importance of good communication in group work, but I was never taught or made aware of what good communication in a team setting actually entails. For example, I frequently wrote emails that had incomplete information.	**Articulates** strengths and challenges during each industrial placement, with contexts. e.g. Working in a team during my industrial placement made me realise how I was unprepared for it. At university, my lecturer had stressed the importance of good communication in group work, but I was never taught or made aware of what good communication in a team setting actually entails.	**Describes** own performances during each industrial placement with general descriptors of success and failure at a superficial level. e.g. Working in a team during my industrial placement made me realise how I was unprepared for it.

Association of American Colleges and Universities. (2009). *Integrated and Applied Learning Value Rubric.* Retrieved from https://www.aacu.org/value/rubrics/integrative-learning

Table 1 Knowledge and Skill Base: Elements and Indicators

ELEMENT OF COMPETENCY	INDICATORS OF ATTAINMENT
1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	a) **Engages** with the engineering discipline at a phenomenological level, applying sciences and engineering fundamentals to systematic investigation, interpretation, analysis and innovative solution of *complex* problems and broader aspects of engineering practice.
1.2 Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.	a) **Develops and fluently applies** relevant investigation analysis, interpretation, assessment, characterisation, prediction, evaluation, modelling, decision making, measurement, evaluation, knowledge management and communication tools and techniques pertinent to the engineering discipline.
1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline.	a) **Proficiently applies** advanced technical knowledge and skills in at least one specialist practice domain of the engineering discipline.
1.4 Discernment of knowledge development and research directions within the engineering discipline.	a) **Identifies and critically appraises** current developments, advanced technologies, emerging issues and interdisciplinary linkages in at least one specialist practice domain of the engineering discipline. b) **Interprets and applies** selected research literature to inform engineering application in at least one specialist domain of the engineering discipline.
1.5 Knowledge of engineering design practice and contextual factors impacting the engineering discipline.	a) **Identifies and applies** systematic principles of engineering design relevant to the engineering discipline. b) **Identifies and understands** the interactions between engineering systems and people in the social, cultural, environmental, commercial, legal and political contexts in which they operate, including both the positive role of engineering in sustainable development and the potentially adverse impacts of engineering activity in the engineering discipline. c) **Appreciates** the issues associated with international engineering practice and global operating contexts. d) **Is aware of** the founding principles of human factors relevant to the engineering discipline. e) **Is aware of** the fundamentals of business and enterprise management. f) **Identifies** the structure, roles and capabilities of the engineering workforce.
1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the specific discipline.	a) **Appreciates** the basis and relevance of standards and codes of practice, as well as legislative and statutory requirements applicable to the engineering discipline. b) **Appreciates** the principles of safety engineering, risk management and the health and safety responsibilities of the professional engineer, including legislative requirements applicable to the engineering discipline. c) **Appreciates** the social, environmental and economic principles of sustainable engineering practice. d) **Understands** the fundamental principles of engineering project management as a basis for planning, organising and managing resources. e) **Appreciates** the formal structures and methodologies of systems engineering as a holistic basis for managing complexity and sustainability in engineering practice.

Notes:

1. *'engineering discipline' means the broad branch of engineering (civil, electrical, mechanical, etc.) as typically represented by the Engineers Australia Colleges.*
2. *'specialist practice domain' means the specific area of knowledge and practice within an engineering discipline, such as geotechnics, power systems, manufacturing, etc.*

Table 2 Engineering Application Ability: Elements and Indicators

ELEMENT OF COMPETENCY	INDICATORS OF ATTAINMENT
2.1 Application of established engineering methods to *complex* engineering problem solving.	**a) Identifies, discerns and characterises** salient issues, **determines and analyses** causes and effects, **justifies and applies** appropriate simplifying assumptions, **predicts** performance and behaviour, **synthesises** solution strategies and **develops** substantiated conclusions. **b) Ensures** that all aspects of an engineering activity are soundly based on fundamental principles - by diagnosing, and taking appropriate action with data, calculations, results, proposals, processes, practices, and documented information that may be ill-founded, illogical, erroneous, unreliable or unrealistic. **c) Competently addresses** complex engineering problems which involve uncertainty, ambiguity, imprecise information and wide-ranging and sometimes conflicting technical and non-technical factors. **d) Investigates** complex problems using research-based knowledge and research methods. **e) Partitions** problems, processes or systems into manageable elements for the purposes of analysis, modelling or design and then **re-combines** to form a whole, with the integrity and performance of the overall system as the paramount consideration. **f) Conceptualises** alternative engineering approaches and **evaluates** potential outcomes against appropriate criteria to justify an optimal solution choice. **g) Critically reviews and applies** relevant standards and codes of practice underpinning the engineering discipline and nominated specialisations. **h) Identifies, quantifies, mitigates and manages** technical, health, environmental, safety and other contextual risks associated with engineering application in the designated engineering discipline. **i) Interprets and ensures** compliance with relevant legislative and statutory requirements applicable to the engineering discipline.
2.2 Fluent application of engineering techniques, tools and resources.	**a) Proficiently identifies, selects and applies** the materials, components, devices, systems, processes, resources, plant and equipment relevant to the engineering discipline. **b) Constructs or selects and applies** from a qualitative description of a phenomenon, process, system, component or device a mathematical, physical or computational model based on fundamental scientific principles and justifiable simplifying assumptions. **c) Determines** properties, performance, safe working limits, failure modes, and other inherent parameters of materials, components and systems relevant to the engineering discipline. **d) Applies** a wide range of engineering tools for analysis, simulation, visualisation, synthesis and design, including assessing the accuracy and limitations of such tools, and validation of their results. **e) Applies** formal systems engineering methods to address the planning and execution of complex, problem solving and engineering projects. **f) Designs and conducts** experiments, **analyses and interprets** result data and **formulates** reliable conclusions. **g) Analyses** sources of error in applied models and experiments; eliminates, **minimises or compensates** for such errors; **quantifies** significance of errors to any conclusions drawn. **h) Safely applies** laboratory, test and experimental procedures appropriate to the engineering discipline. **i) Understands** the need for systematic management of the acquisition, commissioning, operation, upgrade, monitoring and maintenance of engineering plant, facilities, equipment and systems. **j) Understands** the role of quality management systems, tools and processes within a culture of continuous improvement.
2.3 Application of systematic engineering synthesis and design processes.	**a) Proficiently applies** technical knowledge and open-ended problem-solving skills as well as appropriate tools and resources to design components, elements, systems, plant, facilities and/or processes to satisfy user requirements. **b) Addresses** broad contextual constraints such as social, cultural, environmental, commercial, legal political and human factors, as well as health, safety and sustainability imperatives as an integral part of the design process. **c) Executes and leads** a whole systems design cycle approach including tasks such as: - determining client requirements and identifying the impact of relevant contextual factors, including business planning and costing targets; - systematically addressing sustainability criteria; - working within projected development, production and implementation constraints; - eliciting, scoping and documenting the required outcomes of the design task and defining acceptance criteria; - identifying assessing and managing technical, health and safety risks integral to the design process; - writing engineering specifications, that fully satisfy the formal requirements; - ensuring compliance with essential engineering standards and codes of practice; - partitioning the design task into appropriate modular, functional elements; that can be separately addressed and subsequently integrated through defined interfaces; - identifying and analysing possible design approaches and justifying an optimal approach; - developing and completing the design using appropriate engineering principles, tools, and processes;

	- integrating functional elements to form a coherent design solution; - quantifying the materials, components, systems, equipment, facilities, engineering resources and operating arrangements needed for implementation of the solution; - checking the design solution for each element and the integrated system against the engineering specifications; - devising and documenting tests that will verify performance of the elements and the integrated realisation; - prototyping/implementing the design solution and verifying performance against specification; - documenting, commissioning and reporting the design outcome. **d)** **Is aware of** the accountabilities of the professional engineer in relation to the 'design authority' role.
2.4 Application of systematic approaches to the conduct and management of engineering projects.	**a)** **Contributes to and/or manages** *complex* engineering project activity, as a member and/or as the leader of an engineering team. **b)** **Seeks out** the requirements and associated resources and **realistically assesses** the scope, dimensions, scale of effort and indicative costs of a *complex* engineering project. **c)** **Accommodates** relevant contextual issues into all phases of engineering project work, including the fundamentals of business planning and financial management **d)** **Proficiently applies** basic systems engineering and/or project management tools and processes to the planning and execution of project work, targeting the delivery of a significant outcome to a professional standard. **e)** **Is aware of** the need to plan and quantify performance over the full life-cycle of a project, managing engineering performance within the overall implementation context. **f)** **Demonstrates** commitment to sustainable engineering practices and the achievement of sustainable outcomes in all facets of engineering project work.