



Guide to Work Experience for Undergraduate Students

Step-by-Step

Decide that your organisation will offer work experience to either a University student or a TAFE student.

Seek appropriate authority from the CEO to establish the position(s).
Draft a position description (see Appendix 2)
Place item in the annual budget to employ work experience student(s).

Contact the Department of Civil Engineering at all the universities in your area or State to find out how their students obtain work experience.
Suggest either the Head of Department or the Civil Departmental Secretary.

Contact TAFE Colleges to find out how their students obtain work experience.

Decide broad parameters for the type of work you are going to give the student .
(See Appendix 1 for some ideas.)

Prepare and place notice about applying for work experience on notice boards. Such a notice should include following information :

- Name of your organisation and address, and place of employment, if applicable.
- Wording such as "Work Experience Opportunity".
- Type of student, i.e. "Completed Second Year Civil Engineering". Dates to commence/end. (Discuss with university/TAFE to ensure dates do not overlap with semester or exam time)
- Words such as "Salary to be Negotiated". Do not include money figure on notice, as that will be dependent on number of years study completed and number/type of units passed.
- Name and phone number for further information.
- How to submit application – i.e. closing date, in writing or email, etc.

Appoint someone to assess applications and conduct interviews of short listed students.

Encourage the student to join IPWEA as a student member.

Appoint a supervisor. (The supervisor must be aware of the Council's expectations, the university/TAFE requirements and the needs of the student.)

Appoint a mentor. (Please note the mentor should not be the same person as the supervisor.) See "*Guide to Mentoring*".



Guide to Work Experience for Undergraduate Students

(Exposure to Professional Engineering Practice)

Introduction

To be eligible for graduation with an engineering degree, undergraduates are required to be exposed to professional engineering practice for a period of not less than twelve weeks or 480 equivalent hours. This requirement has long been called simply "Work Experience" and it will be referred to as that throughout this document.

The requirement for undergraduates to obtain work experience is placed by *Engineers Australia* (EA), formerly The Institution of Engineers, Australia. EA is the professional engineering body that accredits all engineering courses, at all Australian universities, as being academically suitable for professional recognition.

Refer to EA's website for more information. www.engineersaustralia.org.au An extract from EA's Accreditation Criteria Guidelines (Document GO2) is reprinted at the end of this document.

Background

It is widely recognised that there was no real substitute for first-hand experience in an engineering-practice environment outside the university (or TAFE college). In past years, the ideal experience would be gained within an organisation that employed professional engineers (i.e. generally trained to university level and eligible for membership of EA) under whose supervision the undergraduate would work. One or more summer vacations arranged in this way would fulfil the 'work experience' requirement.

EA has recognised that the above fulfilment cannot always be obtained, not least of the reasons being that employers are not always willing to take on unqualified people just for work experience. They have, therefore, suggested a 'mix' of activities and exposure that will contribute to a good insight into professional engineering. Notwithstanding, a substantial component of vacation work in an "Engineering Environment" is still required.

An "Engineering Environment" is considered to be representative of a work environment where the undergraduate is provided with access to, and support from, professional engineers. The organisation's

functions will provide exposure to structured engineering processes in terms of design, research, manufacture, fabrication, construction, installation, commissioning, operations, maintenance, management, procurement or finance.

Guidance for Employers

It will be necessary to plan ahead to employ one or more work experience students. The cost of this must be included in the annual budget.

It is preferable for the duration of work experience to be long enough for the student to understand not just individual tasks, but how the process of engineering fits into local government and, further, into society.

In order to keep an undergraduate productive over the period of work experience, the following suggestions are made:

Planning at the beginning. Set clear expectations and a defined work scope together with any council procedures relevant to the undergraduate. Normal engineering planning will foster a mutually beneficial work experience. The undergraduate could possibly be used to assist in developing this work scope.

Break up the work. Assign the undergraduate to a range of different aspects within the organisation, even for only a couple of half days per week. The undergraduate will gain valuable experience seeing fully how an engineering department or organisation works, plus exposure to the 'engineering culture'. This could be achieved by spending time with an engineer during various aspects of their work through Design, Validation, Maintenance, Procurement, Sales, Drawing Office, Tradesman Offsider, Scheduling, Site Inspections and Quality Systems. Administrative aspects such as Human Resources and Accounts should also be considered.

Reporting

The university will require evidence of satisfactory completion of a student's vacation work experience as it is a mandatory requirement of all accredited engineering courses. Some universities formalise their requirement by issuing the student with a Logbook in which all exposure to professional engineering practice is recorded.



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The logbook will contain the following details:

- Date and range of work experience
- Organisation name (engineering department and location, etc)
- List of all major jobs/activities performed
- Validation (see below)
- Number of (weighted) hours worked
- Endorsement by supervising engineer, and company stamp.

It can be argued that the undergraduate's professional experience as an engineer begins with vacation employment. Many professional engineers keep a regular record of their career progression to facilitate updating of their curricula vitae.

The vacation employment is the first episode in their professional career and may be used when preparing the Practice report when they eventually apply for Chartered Professional Engineer status with EA.

Undergraduates should be encouraged to keep a daily journal. It does not have to be highly detailed, but should have sufficient information to remind both student and supervisor of significant events, tasks and activities undertaken. There is no prescribed format for the journal (i.e. narrative, headings/columns, topic notes etc).

Undergraduates should take note of the following in particular:

- Personal contribution and responsibilities
- Problems faced
- Solutions found
- Engineering judgments made (and why)
- Impact of solutions and judgements generated
- Reflections on how practical experience links with engineering theory
- Discussions with practising professional engineers, and their opinions
- Copies of relevant documents such as payslips, timesheets, memos, etc.

Validation of Report

On completion of the vacation work experience period, the undergraduate will be expected to write a one page report giving a brief overview of the work experience and summarising what has been learned. This is in

addition to the entries into the logbook and the journal.

The undergraduate will ask his/her supervisor to sign the logbook and journal and to verify on the one page report that it is a true record of work carried out and achieved. The undergraduate will then hand the one page report to the university for noting in the student's file.

The whole purpose of the procedure set out above is to place the onus of reporting onto the undergraduate and to minimise the amount of work the supervisor is asked to do.

Payment and Insurance

There are no set guidelines for payment during work experience. Some organisations refer to their relevant Award and make salary payments accordingly, while others do not offer any payment. However, as a guideline, a figure of 0.8 of a first-year graduate's salary for an undergraduate entering their final year would be average. This figure of 0.8 would be reduced by 0.2 for each year earlier the work experience is sought and gained.

Most universities cover their undergraduates for worker's compensation insurance for *approved vacation work experience*. The employing organisation should check with the university to confirm coverage. The universities do not normally carry any other type of insurance product for the undergraduates.

Follow Up

Once a student is employed for work experience, every effort should be made to encourage him/her to join IPWEA as a student member. The mentor should keep in contact once the student has returned to university and offer encouragement to apply for a position within local government engineering.

Conclusion

Providing work experience for undergraduates is a significant opportunity to expose students to a career in local government/public works engineering. It will not, of course, guarantee that graduates will seek to commence a career in this field, but it does provide the industry with a profile in the undergraduate population, a profile that does not currently exist.



Guide to Work Experience Engineers Australia Accreditation Criteria Guidelines (Document G02)

"3.2.5 Exposure to Professional Practice

Exposure to professional engineering practice is a key element in differentiating a professional engineering degree from an applied science degree. Although the status of Chartered Professional Engineer requires a substantial period of experiential formation in industry after graduation, it is clearly unsatisfactory for the student's perceptions of engineering to develop, over the first four critical years, in complete isolation from the realities of practice. There is obvious benefit in ensuring that at least an element of professional formation is interwoven with the academic curriculum, to provide a balanced perspective and relate academic preparation to career expectations.

Professional practice exposure must be considered as an integral learning activity within the educational design process and make a significant and deliberate contribution to the delivery of educational outcomes. The objectives associated with each major episode of exposure need to be clearly understood by all constituencies and documented as a formal learning activity within a designated academic unit. There must be defined contributions from these activities to the specific learning outcomes of academic units and in turn to the educational outcomes of the program as a whole.

There should be a formalised tracking, monitoring and assessment of the learning outcomes associated with professional practice exposure. This may for example be through a journal or portfolio system where students record and self-analyse experiences against learning outcome targets or capability profiles.

Professional engineering practice exposure must include some of the following:

- *use of staff with industry experience, and industry visits and inspections*
- *practical experience in an engineering environment outside the teaching establishment,*
- *mandatory exposure to lectures on professional ethics and conduct, and use of guest presenters,*
- *an industry based final year project,*
- *industry research for feasibility studies,*
- *study of industry policies, processes, practices and benchmarks,*

- *interviewing engineering professionals,*
- *industry based investigatory assignments,*
- *direct industry input of data and advice to problem solving, projects and evaluation tasks,*
- *electronic links with practising professionals, and*
- *case studies.*

It is considered that there is no real substitute for first-hand experience in an engineering-practice environment, outside the educational institution. Engineers Australia strongly advocates that all engineering schools include a minimum of 12 weeks of such experience as a requirement for the granting of qualifications, in addition to the other elements suggested, and make strenuous effort to assist all students to gain placements of suitable quality. However it is recognised that this may not always be possible.

*The requirement for accreditation is that programs incorporate a mix of the above elements, and others * perhaps offering a variety of opportunities to different students * to a total that can reasonably be seen as equivalent to at least 12 weeks of full time exposure to professional practice in terms of the learning outcomes provided. In the same way as for other modes of learning, submitted documentation must explain how the various dimensions of professional practice exposure contribute to the overall educational design.*

Where practice exposure is incorporated within the four-year equivalent curriculum, it must embody assessable requirements comparable with other curriculum elements that attract similar credit.

Where it consists of work experience in industry, not otherwise formally assessed, it should be counted in addition to the four-year academic requirement.



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Appendix 1 - Practical Work Examples

Practical Examples of Work That Can Be Offered

"We have used him on hydraulic and structural design work and also some investigations. I have mentored him mainly by giving him examples of my past work. Also, he has been able to learn some relatively simple software such as Hec-Ras on the job".

"Our office employs a different trainee learning and doing engineering drafting work. They have been very helpful in carrying high loads and in doing the simpler work, finishing off design work done by our paraprofessional civil designers".

"Our City Council recently engaged two 3rd year students for their 3 month break to undertake footpath asset data collection. This work involved the students physically inspecting our footpath network for potential hazards. The students had to measure, categorise and log the hazards on mobile computers. The information was then downloaded daily and at the end of the exercise the students had to present the data back to Council's engineers, thus giving the responsibility of data management and reporting to the students".

"The student had completed 1st year in civil engineering. He was employed on a project to capture data on our road signs, and test them for retro reflectivity".

"They effectively operate as engineering technicians with responsibilities expanding as experience grows. Survey, design and project supervision is the norm".

"I have employed PhD students on project work – it's a great option and 1/5 the cost of consultants. Examples are dredging investigations for recreational lakes, traffic studies, environmental assessments and options reports on community facilities. This is usually via a direct payment to the university. Downside is it may take 2 years to complete".

"Survey and road and drainage design (rural and urban) – both gravel and sealed roads. Undertaking investigations/inspections of simple traffic engineering problems. Also traffic studies and council infrastructure such as traffic signs, automated traffic counters etc".

"Undertaking survey and design jobs such as driveways, footpaths, kerb and guttering works – incorporates using survey equipment, design in CAD software, estimating costs based on standard fees and charges, review of environmental factors and setting out/markings on-site for construction".

"Document preparation for sending out tenders, traffic committee meetings, rolling works programs etc; also maintaining Council databases".

"My first was drafting with some basic road alignment and pavement design, the second was undertaking a land contour survey which was subsequently used for land subdivision purposes and the civil work attached thereto".

"Two months on drainage strategies, analysing catchments, determining pipe upgrades and costs of these works and summarising in report format. One month assisting subdivision engineer. Assessing small building licence applications for engineering requirements (drainage/road safety), site inspections and prepared drawing database of plans in storage. During the three months student was also exposed to some small design projects and road safety queries, team meetings etc".

TAFE STUDENTS

"With regard to TAFE students – we have two new employees who are both completing the last six months of their Diploma in Civil Engineering. They have been appointed into full time positions, with allowance of 8 hours paid study time, and flexible working arrangements on other days to suit hours at TAFE. They are employed at two levels below the position, which will go to full level when the Diploma is completed".

IPWEA gratefully acknowledges assistance from Logan City Council, Perth City Council, Richmond Valley Council, City of Gosnells, Randwick City Council, Latrobe City Council, Toowoomba City Council and the Shire of Coolgardie.



Guide to Work Experience Appendix 2 - Position Description Forms

Position Description Forms - Example 1

Position Title: Student – Engineering Services (Temporary) Position
Date:
Position No:
Department: Engineering Services
Branch: Design & Survey
Supervisor: Senior Engineer Design
Classification:
Award: *State* Local Government Officers' Award -
Award Allowances: As per Award
Agreement: City Council Enterprise Bargaining Agreement

Objective of the Position

The objective of this position is to complete minor projects as required, and to gain experience in investigations, design, project management, construction and maintenance, asset management, operations and other activities associated with the provision of engineering services in local government.

Primary Delegations & Responsibilities

This position reports to Branch Managers or Technical Supervisors as delegated in the Engineering Services Department. It has no supervisory responsibilities.

Education/Qualifications

1. Currently undertaking studies at Graduate level for a degree in Engineering, Science, Environmental Management or associated field. *The number of years of study completed, or type of units passed (eg structures, hydraulics etc) may be stipulated.*

Knowledge, Skills & Abilities

1. Skills in use of computers and awareness of current technology in these systems.
2. Ability to set and achieve results through self-organisation.
3. Basic oral and written communication skills.
4. Developing professional interests in the provision of engineering services in local government.

Additional Position Requirements

1. Possession of a current "C" Class driver's licence.

Duties of the Position

1. Under delegated direction from Branch Managers or Technical Supervisors perform various duties to assist Engineering Services Department Branches maintain a high level of service to their customers.
2. Carry out specified technical research and provide advice and support for problem solving in matters pertaining to Engineering Services Department Branch activities.
3. Maintain effective communications with personnel of Engineering Services Department Branches and other Council Departments to provide an open and free flow of information.
4. Other duties within the ambit of the Award classification as may be required by the Branch Manager.



Guide to Work Experience Appendix 2 - Position Description Forms

Position Description Forms - Example 1 (Continued)

Key Selection Criteria

Please address each of the following Key Selection Criteria:

1. Demonstrated customer service skills with the ability to provide accurate and timely advice in a helpful manner.
2. Developing knowledge of the application of workplace health and safety principles and a commitment to the principles of anti-discrimination and equal opportunity in the workplace.
3. Developing aptitude for work in local government engineering.

General Terms of Appointment

1. All employees are required to participate in Continuous Improvement Process.
2. It is a requirement of all staff to uphold the Council's equal opportunities policy, and to ensure that the intention and spirit of that policy is followed in their work, including the work of others for whom they are responsible.
3. All employees at Toowoomba City Council must give full support to health and safety legislation. We seek from every employee active co-operation with those responsible for the effective planning, organisation and monitoring of our health and safety.
4. All employees at Toowoomba City Council must agree to act within the requirements of Council's policies.
5. All employees are bound to act in accordance with the Local Government Act 1993 and the provisions of Council's Code of Conduct.
6. Council's values for serving the community are: responsive customer service; integrity and impartiality; openness and accountability; and equity.
7. The values which govern the conduct of management and employees are: loyalty, respect and trust; corporate teamwork; excellence and best practice; open, fair, accountable and efficient work practices; and staff development.
8. All employees are to be mindful and report all instances of environmental harm, which may be caused or discovered in carrying out their duties. Employees working on an Environmentally Relevant Activity Site are bound by the provisions of the Integrated Environmental Management System.

SIGNATURE OF MANAGER

-----/-----/-----
DATE

SIGNATURE OF APPOINTEE

-----/-----/-----
DATE



Institute of
Public Works
Engineering
Australia

Guide to Work Experience Appendix 2 - Position Description Forms

Position Description Forms - Example 2

POSITION TITLE: Vacation Engineer		POSITION HOLDER'S NAME: Vacant	
REPORTS TO:		DIRECTORATE:	
AWARD/AGREEMENT:	CLASSIFICATION OF POSITION: Level 2	CUSTOMERS (internal & external): Employees, Public, Govt. Depts.	
EXPENDITURE & REVENUE \$: Nil		NUMBER OF EMPLOYEES SUPERVISED BY THIS POSITION: Nil	

KEY FOCUS OF THE TEAM <i>To be filled in</i>	KEY FOCUS OF THIS POSITION Supports the provision of an efficient, well-informed and effective engineering service for the City.
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ORGANISATIONAL STRUCTURE		
SUPERVISOR		
		Nil

ATTRIBUTES (SKILLS AND KNOWLEDGE) REQUIRED FOR THE POSITION	CONTEXT TO WHICH SKILLS AND KNOWLEDGE APPLIES
Well developed verbal and written communication skills	Liaises with staff and customers Assist in producing written correspondence and response to queries
Well developed analytical and problem solving skills	Ability to assist in problem solving Ability to provide assistance in completing tasks
Ability to undertake tasks thoroughly, accurately and timely with varied supervision	Works in a busy environment Assists in a number of projects at one time
Ability to work both individually and as part of a team	Works on tasks independently Works as part of the Technical Service Team
Computer skills	Works with all Microsoft packages Data entry and typing skills



Guide to Work Experience Appendix 2 - Position Description Forms

Position Description Forms - Example 2 (Continued)

<p>QUALIFICATIONS REQUIRED TO UNDERTAKE THE POSITION:</p> <p>Progress towards Civil Engineering Degree or similar Current 'C' Class Drivers Licence</p>	<p>PHYSICAL & ENVIRONMENTAL DEMANDS OF THE POSITION:</p> <p>Ability to work in a sitting position on a VDU Noise levels low</p>
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KEY AREAS OF RESPONSIBILITY	DEMONSTRATED COMPETENCIES
1. Adding value and completing position responsibilities	Ensures verbal and written communication provided to the customer is correct, factual, timely, customer focused and in accordance with the relevant Acts, Legislation, Bylaws, standards and guidelines and to receive training and guidance in these areas. Ensures Supervisor is aware of difficult or sensitive issues Plans, organises and responsible for quality of own work.
2. Achieving customer focused service	Work and behaviour adds value to the business of the City within area of responsibility. Makes recommendations to the Manager/Supervisor on improvements to ensure an effective, accurate service is given to the customer. Information received from the customer is given due consideration within existing processes prior to a decision being made.
3. Working with external and internal policies, systems, processes and equipment	Works with established procedures, processes, systems and equipment. Works in a manner, which is consistent with legislation affecting current tasks including EEO, Safety and Health.
4. Communication and Relationships	Manages conflict and differences and contributes to the resolution of problems to maintain an effective working environment. Demonstrate commitment to working both individually and as part of the Team to achieve the strategic goals for the City. Contributes ideas and information.
5. Learning and Growth	Uses feedback to develop skills, behaviours and attitudes. Learns and applies new competencies to keep up to date on the job. Receives training in aspects of Local Government Engineering Issues.
6. Finance	Ensures work is undertaken in a manner, which is consistent with the budget and resources allocation.

SIGNATURES

EMPLOYEE	_____	DATE
SUPERVISOR	_____	DATE
DIRECTOR	_____	DATE

IPWEA gratefully acknowledges the assistance provided by Toowoomba City Council and Gosnells City Council in providing examples of position description forms for vacation student employment.