

## **Final year projects Australia**

### **Final year engineering projects in Australia and Europe**

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## **Abstract**

The paper starts by emphasising that final year engineering projects are regarded important in the training and education of professional engineers in Australia and Europe. The sources of projects available to students were also mentioned. Some Australian universities insist individual projects but some not, each with their own reasons. However, it can be argued that all European universities run individual projects. In most cases, whether it is in Australia or Europe, the total load for final year engineering project is about 6.25 % of the load of the engineering programs. Assessment methods were also described. They were all different whether it is in Australia or Europe but not very significant. It was discovered that literature review, oral presentation and written report or dissertations were important elements in the assessment schemes. Many university staff, in both continents, encouraged students to publish their work in international conferences and journals if the originality of the projects was high. It can be argued that individual project is most effective in learning outcome; however, the cost involved is also very high and its sustainability in smaller universities in Australia is in doubt.

**Keywords:** Final year engineering projects, individual project, assessments, oral presentation, dissertation, conferences, journals, Europe and Australia.

## **Introduction**

At most universities in Australia, Bachelor of Engineering degree programs follow a system of two semesters per year for four years. Students have to complete 4 courses per semester so they have to complete 32 courses in total over 4 years. These courses consist of three

categories of core, major and elective subjects. Other universities may call them core subjects for specialised degree, elective subjects for specialised degree and elective subjects from outside the School/Faculty (Zayegh, 2007).

In many engineering programs around the world, one of the key aspects required from the students is that they complete an independent research project in their final year of studies. Project work is now considered to be an important part of an engineer's training (Hurst, 1993; Blicblau, 2007). Students enrolled in their final year of engineering programs at University of Southern Queensland, Australia are required to undertake and complete an individual final year research project (capstone project). Students may select a research project from a list offered by academic staff, or may suggest their own topic based on individual interest, or arising from their period of work experience. The research project may take various forms involving technology research and development, experimental work, computer analysis, industry liaison and business skills (Goh et al., 2009). Other universities also have similar projects for their final year engineering students but they may not be an individual project and in many cases, they are group projects (Blicblau, 2007; Zayegh, 2007; University of Adelaide, 2009; University of Newcastle, 2009a; Central Queensland University, 2009; University of Western Australia, 2009; Deakin 2009). The total time spent by students for one project is around 300 hours but some students spend 600 hours (Goh et al, 2009; University of Adelaide, 2009). However, Swinburne University of Technology expects students to spend a minimum of 160 hours only (Blicblau, 2007). Every university in Australia places great emphasis on project work because Engineers Australia, the peak engineering profession qualifying body in Australia, regards project work as a core enabling aspect of engineering education (Blicblau, 2007).

The objective of this study is to compare and contrast the delivery and management methods of final year engineering projects by different universities in Australia and Europe so that engineering educators can learn how each of the universities in the two continents delivers and manages their undergraduate final year engineering projects.

### **Capstone projects in Australia**

The final year engineering research projects of seven universities in Australia were selected for discussion; the seven universities were Swinburne University of Technology (Swinburne), University of South Australia (UniSA), Victoria University (VU), University of Newcastle (Newcastle), University of Adelaide (Adelaide), University of Western Australia (UWA) and University of Southern Queensland (USQ). The characteristics of their final year engineering research projects were summarised in Table 1 and more details of them will be mentioned in the coming paragraphs.

#### ***Swinburne***

In Swinburne University of Technology, Melbourne, the timeline of the projects extend over two semesters. During the first semester, students define their project, often in discussions with various staff members. However, if they wish to propose a project that is also often accepted. This is done in consultation with a staff member. The next step in the project organization is the development of project proposal which may include a business plan, a research project or a design proposal. Those proposals all require intensive searching of the literature, and culminate in a substantial “literature survey” as part of the project proposal. Once the project proposals have been submitted, the task of determining the structure of the

project is also completed. The process takes approximately 10 weeks before any “project work” can commence. Students work in groups of two or three, depending on the project theme or topic. Students are given the choice of submitting either a formal engineering report (of approximately 35 pages) or preparing a technical paper in accordance with guidelines of the American Society of Mechanical Engineers (ASME) or Society of Automotive Engineers (SAE) at the end of the second semester. Very few average students chose the “paper” writing path. In most cases, “papers” were prepared at the suggestion of the supervisors after the submission of final reports. For those students who choose the “paper” writing path, the goal of the project is very oriented towards manuscript preparation for conference submission and follows different guideline from those preparing a report. These students must now ensure that their results are experimentally accurate, can be statistically validated and the literature review is comprehensive. Often the students who contemplate postgraduate studies undertake this path (Blicblau, 2007).

The assessments of the capstone project are composed of four sections. The first being a project proposal, the second a written report (or paper/manuscript), the third an oral presentation and the last, is a poster preparation. Each form of assessment is undertaken by two independent assessors (who may not be the students’ supervisor) and cumulative grade is developed. In this way, bias is minimized for each section of the assessment, as well as not applying any penalties to those students who do succeed (or wish) to develop a manuscript for publication considerations. The oral presentation of the capstone projects is encompassed in a “conference” day, which occurs a few days after the end of all the examinations. The majority of students and staff attend these sessions. In addition, external personnel, who may have sponsored the project or were acquainted with the work, are invited to listen to the presentations. All students must present their work in accordance with strict conference

guidelines, 20 minutes is allocated for each presentation. At the end of each presentation, two minutes is allowed for questions. At the same time as the presentations are being given, the posters are displayed in a specially prepared room. At the end of the presentation session, the students are required to attend their posters and answer any questions. On account of the requirements for accreditation by Engineers Australia, Swinburne has developed generic attributes appropriate to final year projects of all of engineering programs, which are depicted in Table 3. Anecdotal reports by students indicated a high level of satisfaction with the management and outcomes of the work in the form of conference participation, presentation and publications (Blicblau, 2007).

### *University of South Australia*

In the final year of undergraduate degree programs in the School of Electrical and Information Engineering at the University of South Australia (UniSA), students accomplish hands-on design projects that account for a quarter of the year's academic credit load. The majority of the projects, depending on each year, there are between 60% and 80% of the projects are industry sponsored. Recently, high school students have also been involved in these projects. The program has been successfully running for the past 3 years and proved to bring benefits to high school students, university students and also to companies that participate in the program (Nafalski and Nedic, 2008).

The involvement of high school students has been inspired by a major shortage of engineering graduates that need to be addressed at the high school level if not earlier. The projects are designed to develop and foster interest in engineering among high school students and also to develop management and generic skills of final year university students.

With industry sponsorship and high school students' involvements in the final year engineering projects, UniSA is actually providing service-learning, which is a teaching and learning pedagogical approach that combines active student learning with a meaningful community service (Nafalski and Nedic, 2008).

### ***Victoria University***

Zayegh (2007) claimed that the final year projects of undergraduate electrical engineering program in Victoria University, Melbourne would provide the students with the knowledge and the techniques to investigate and solve an engineering problem based on the knowledge acquired over the years of the program. It also provides them with method of scientific enquiries, including the "tricks of trade".

The final year engineering design and project subject consists of two semesters, which could be one or two projects. It has five contact hours per week. The students cannot enrol in the subject until they have completed all the subjects of their first three years. The subject has theoretical components in parallel with project design in first semester and ends with written examination and a major project design and implementation with formal project report and presentation at the end of the second semester (Zayegh, 2007).

The coordinator of all the final year projects will invite all academic staff to propose some projects with brief description for each project. Also, the students are invited to submit projects of their interest. All these projects will be assessed by the coordinator to ensure that they satisfy the academic requirements of the program. The main requirements are satisfying the area of specialisation, research and problem solving components, level of complexity and

time requirement, including hardware and software components. The coordinator will list all the approved projects with their provider names and give the students the opportunity to select the projects of interest. All projects are individual project and supervised by one academic staff. Project provided by industries may be supervised by academic and industry supervisor. All marked work over the year will be added to generate the final mark of the subject as shown in Table 4 (Zayegh, 2007).

From Table 4, it can be found that the assessment panel will be responsible for only 30% of the total assessment marks due to limited contact with the students except during presentation sessions (Chan, 2001). On the other hand, the principal supervisor will be responsible for 65 % of the total assessment marks which includes the final report mark. The principal supervisor will follow a set of criteria for his/her assessment (Zayegh, 2007).

### ***University of Newcastle***

In the University of Newcastle, Australia, final year projects represent the culmination of study towards the Bachelor of Engineering degrees. Projects offer the opportunity to apply and extend material learned throughout the program. Assessment is by means of a seminar presentation, submission of a thesis, and a public demonstration of work undertaken. Projects are undertaken individually or in small groups. This necessarily introduces the dimension of workload management into the program to enable completion of a large, relatively unstructured "assignment" over the course of the semester. The projects undertaken span a diverse range of topics, including theoretical, simulation and experimental studies, and vary from year to year. The emphasis is necessarily on facilitating student learning in technical, project management and presentation spheres (University of Newcastle, 2009a).

This course consists of a combination of Part A and Part B. Students must complete Part A before completing Part B. Students must complete the sequence within a twelve month period. The course is conducted under the direct supervision of an academic staff (University of Newcastle, 2009b):

### *University of Adelaide*

The final year project is considered to be an important part of the engineering education process and projects sponsored by local industry are very welcomed. In the past many companies have benefited considerably from technology developed as part of a final year project. Although the projects normally require a minimum of 300 hours of student time, many students spend up to 600 hours. Students work in groups of two to three but sometimes, one student carries out a project by himself or herself. Many of the final year mechanical engineering student projects in the University of Adelaide are industry-sponsored.

There are two ways in which industries may be involved in final year projects. The first is through the Project Industry Placement program coordinated by the Office for Community Engagement, through the Student-Industry Partnerships Program. The program places undergraduate students supported by an academic supervisor with an innovative industry/company under a collaborative sponsored agreement to carry out a project activity while studying in their final year. The project may be an assessable part of the student's academic program and can cover a period of between 3 to 9 months or up to 600 hours of student's time. Normally only one student works on the project, gains a stipend of up to \$150 per day while completing the project work, and involves regular meetings and monitoring of

students progress to ensure that the project remains on schedule. The total cost to industry for this program is \$10,000. The student commences the project from the beginning of March to end of October on the project, including vacation time in June/July (University of Adelaide, 2009).

The second way that companies may be involved is less structured than the first in terms of project management. Students work in groups of 2 or 3 from the beginning of March until the end of October and may be expected to spend 300 to 400 hours on the project. The project is supervised by a member of academic staff and the students are not paid a stipend. An upfront fee of \$500 to cover incidental expenses is charged. If both the company and the academic supervisor agree that the project has met specified goals, a further payment to the School of Mechanical Engineering of \$2000 is required at the completion of the project (University of Adelaide, 2009).

### *University of Western Australia*

The process of completing a project and delivering a thesis document is an essential element of student professional preparation for their postgraduate career. In terms of assessment, it is the most important course in student undergraduate degree. As a 12 point (2 courses) upper level course, it is the most heavily weighted course in the determination of student final weighted average. More importantly, in the determination of honours levels equal emphasis is placed on the final year engineering project grade and the weighted average. The School of Mechanical Engineering expects the work submitted by students in these courses to be of the highest quality. Past projects have provided the basis for international journal publications,

significant changes in the operations of individual companies, novel designs, and even the formation of a new company (University of Western Australia, 2009).

All projects must be undertaken as individual projects – group or team projects are not permitted for final year projects in the School of Mechanical Engineering. Project topics may be drawn from the list of projects provided on the course website, or individuals may suggest their own topics (provided that they can find a member of the academic staff to supervise the project). Students may undertake projects with supervisors outside the School of Mechanical Engineering, though in such cases students are required to have a co-supervisor in the School of Mechanical Engineering and the approval of the Head of School (this requirement is waived for Mechatronics students undertaking projects in the School of Electrical, Electronic and Computer Engineering or the School of Computer Science and Software Engineering) (University of Western Australia, 2009).

Course contents are in compliance with Engineers Australia's requirements. The course coordinator will present a series of lectures over the course of the project. The lectures are intended to help students develop their research skills, and to provide guidance regarding the expectations for the various project elements. The planned lecture schedule is provided in Table 5; lectures are scheduled for alternating weeks to accommodate lectures for the student group that is one semester "out-of-phase" with the current group. Before students can work in a laboratory or workshop facility, their supervisors must give them a safety induction. Once this has been completed, students and their supervisor must complete the safety induction form (available at the unit website). All students are required to submit this form; if no safety induction is necessary, their supervisor must state this on the form (University of Western Australia, 2009).

During the course of the project, students will be required to submit a (University of Western Australia, 2009):

- project proposal (draft and final versions)
- progress report
- conference paper and abstract
- draft thesis

The assessments of the projects are given in Table 6 (University of Western Australia, 2009).

### ***University of Southern Queensland***

In University of Southern Queensland (USQ), research project is an individual activity; USQ students will have had some experience in undertaking small and sometimes quite large group projects as part of a team in their four problem-based courses. It is likely that much of one's professional life will be spent in effective team work which is usually critical to the success of an enterprise. Ultimately, however, the management of the enterprise is not a collective responsibility – an individual is 'in-charge' and responsible. Recognising and carrying this responsibility is an essential feature which *ENG4111 Research Project Part 1* and *ENG4112 Research Project Part 2* do not normally permit 'joint projects'. However, related (or group) projects may be pursued in parallel by two or more students, but only when there is a clear individual responsibility for separate tasks (Hancock et al., 2009).

In USQ, student workload requirements for research projects are as shown in Table 7 (USQ, 2009a). The assessment details of the two courses are shown in Table 8. Assessments 1 to 4 are assessment for *ENG4111 Research Project Part 1* and will be concluded at the end of semester 1 in June. Students must pass all assessments before they are permitted to proceed

to *ENG4112 Research Project Part 2* in the second semester. For equality and fairness, whether one is an on-campus or off-campus student, in addition to enrolling in *ENG4111* and *ENG4112*, students are required to complete the course *ENG3902 Professional Practice 1* prior to commencing their project. In conjunction with their projects they are required to complete the course *ENG4903 Professional Practice 2*. Each of the four courses that relate to project work has their own assessment items (FOES, 2009a). Four courses are required to ensure that all off-campus students can satisfy the research project and other requirements of Engineers Australia. To ensure fairness and flexibility to transfer from on-campus to off-campus, on-campus students are also required to enrol in the same four courses as their off-campus counterparts (Goh et al., 2009).

### **Capstone projects in Europe**

The final year engineering research projects of three universities in Europe were selected for discussion; the three universities were University of Granada (Granada) in Spain, De Montfort University (De Montfort) in the, United Kingdom and Høgskolen i Østfold (Høgskolen) in Norway. The characteristics of their final year engineering research projects were summarised in Table 2 and more details of them will be mentioned in the coming paragraphs.

#### ***University of Granada, Spain***

The engineering education in the University of Granada, Spain had undergone important changes and will undergo additional changes over the next few years because of the need to achieve international homogeneity between university degree courses, which will thereby guarantee the mobility of professionals as stated in the Declarations of Sorbonne and Bologna

(Sorbonne Joint Declaration, 1998; Bologna Joint Declaration, 1999; Montes et al., 2004).

The Engineering Projects Department has designed the Final Degree Course project (“Proyecto Fin de Carrera”) with two clearly differentiated stages: a study of alternatives and the construction project. Both stages end with a public defence of the work that has been carried out. This obligates the student not only to display a knowledge and command of technical concepts but also to communicate those aspects that have been analysed in the project and that have determined the decisions that have been taken throughout the process. In short, the student is forced to act as an engineer and as a communicator (Montes et al., 2007).

Among the tasks demanded of students when writing up the Final Degree Course project, the elaboration of the environmental impact study is given great importance, and students are informed that the result of this study may determine whether or not the planned work is carried out (Montes et al., 2007).

### ***De Montfort University, United Kingdom***

In De Montfort University, United Kingdom, the Final Year Engineering Project forms an important part of the academic requirements for every final year engineering student. The individual project allows students to engage in a substantial piece of individual research and/or product development work focused on a topic relevant to their specific discipline. The topic may be drawn from a variety of sources including: their placement experience, academic staff’s research groups, the company in which they are employed or a subject of personal interest. The chosen topic requires the student to formulate problems, conduct

literature reviews, determine solutions, evaluate information, develop hardware & software as appropriate, process data, critically appraise and present their findings using a variety of media. The project topic will be assessed for suitability to ensure sufficient academic challenge and can be satisfactorily supervised by an academic member of staff (De Montfort University, 2009).

The assessment will normally include the presentation of a written report and an oral presentation. As a result of the Final Year Engineering Project, students will be able to develop a range of practical skills including project management, data information collection, practical problem solving, theoretical analysis, focussed research and communication skills to the solution of an identified problem within a relevant discipline. On occasions final year engineering students also have opportunities to publish their work if it is deemed sufficiently original (De Montfort University, 2009).

### *Høgskolen i Østfold, Norway*

Final year projects are undertaken in collaboration with external companies or institutions in both the public and private sectors. Students work with real engineering tasks, and give a written and oral presentation of their work. The project is also assessed on the basis of its presentation at EXPO, an exhibition of all final year projects. The final year project consists of 15 credits out of the total 180 credits for the degrees. The Faculty's international cooperation includes two partners in Germany, Fachhochschule Aachen and Hochschule Wismar. Fachhochschule Aachen has the potential of further developing the field of Construction Engineering, and Hochschule Wismar specializes in mechanical engineering, online teaching and learning, and international student projects. Høgskolen i Østfold students

have completed projects in Aachen and students from Aachen have spent their compulsory industrial practice periods in Norway. Cooperation with Wismar has been active in many fields, inclusive Wismar student traineeships in Norway and annual staff exchanges (Høgskolen i Østfold, 2009).

## **Results and discussions**

With the approaches used by Swinburne University of Technology in delivering and assessing the final year engineering projects, it was found that the capstone project have provided students with skills in project proposal, project execution, experimental work and communication skills. The outcomes of some of the capstone projects have seen undergraduate student work accepted and presented at local and international conference, as well as a number of international journal articles (Blicblau, 2007).

Nafalski and Nedic (2008) claimed that there were a lot of merits for running the final year engineering projects in the form carried out in the past three years by UniSA. However, UniSA pointed that that the program required significant resources, particularly extensive effort and time of university and industry supervisors and therefore has only been running on a small scale only. The program appears to be the first in Australia

The industry/university partnership program carried out in the University of Adelaide enhances student skills through relevant real-world projects in research and development and profits industry by collaboration in training expertise transfer, innovation and development (University of Adelaide, 2009).

The University of Western Australia claimed that the final year engineering project provides students with an opportunity to undertake an extensive independent exploration of a particular topic. In addition to applying the skills that students have developed in their undergraduate courses, they will develop their research skills, project management skills, and technical communication skills (University of Western Australia, 2009).

In University of Southern Queensland, it was discovered in a recent study that most students have difficulty to start with their projects, particularly in the area of literature review. The study will recommend some suggestions to improve the situations and attain the goals of the final year engineering projects.

In University of Granada, the final year project allows the student to use skills that can be applied to specific cases, ensuring that a perfect approach to the problem is made, that the project to be carried out is clearly defined, and that possible alternatives are taken into consideration, from technical, economic, and environmental perspectives, and selected using several criteria. The technical documents that make up the project are written and presented (Montes et al., 2007).

It was found that whether it is in Australia or Europe, final year engineering project is an important part in professional engineer education and training. The projects can be proposed by academic staff, industry-based or proposed by students through their innovation or via their industrial placements. Some universities have individual projects like USQ and University of Western Australia (Goh et al., 2009; University of Western Australia, 2009). It can be argued that these universities believe that the ultimate management of an enterprise is not a collective responsibility but an individual is 'in-charge' and responsible (Hancock et al.,

2009). On the other hand, some universities have one to three students in their final year engineering projects such as University of Adelaide and University of South Australia, which have a lot of large industry-based projects and believe that only team work can handle these large projects smoothly (University of Adelaide, 2009; Nafalski and Nedic 2008). De Montford University mentioned that the final year engineering projects in that university is an individual project (De Montford University, 2009). The other two European universities chosen did not mention about whether their projects were an individual projects or a team projects but it appeared to the authors that they were individually based.

The time spent by these students on their projects for the two semesters or over 12 months is around 300 hours, i.e. around 6.25 % of the total workload in their engineering degree programs. However, the Norway students of Høgskolen i Østfold spent 8.33% of the load of their programs (Goh et al., 2009).

As far as assessments were concerned, USQ requires students to hand in project proposal, project specification, project appreciation, progress assessment, attendance at presentation, oral presentation, partial draft dissertation and project performance. Unlike some universities, assessment results of the first seven entities may not be counted entirely towards the final assessment, the dissertation in USQ; the supervisor can allocate any weight to the first seven assessments in the final marks because of the lack of clarity in the assessment process. However, a second assessor would be required to assess the dissertation to ensure fairness, which unfortunately can treat the first seven assessments in the same way as the supervisor. However, this means that the supervisor can give only 50% of the total marks. The final grade awarded to a student will depend on the grades awarded by the two assessors plus the cross-moderation result. This is where fairness was returned to the student (Goh et al., 2009).

On the other hand, some universities like Victoria University and University of Western Australia have fixed weights to each assessment but they are different in details. In Victoria University, the supervisor would give 65% of the total marks, while in the University of Western Australia, the supervisor could give at most 35% of the total marks (Zayegh, 2007; University of Western Australia, 2009). There were no assessment details and criteria from the chosen European universities but it can be argued that they do exist in one way or the other. Victoria University in Melbourne, Australia seems to be the only institution that has formal examinations in the final year engineering projects.

The final year engineering projects of the UniSA involved high school students and this was innovative as it would bring about the interest and sense of importance of engineering to high school students. The involvement of high school students had been inspired by a major shortage of engineering graduates that needed to be addressed at the high school level if not earlier (Nafalski and Nedic 2008).

Another point worth mentioning about final year projects were the conference or journal publications brought about by it. Many bigger universities, e.g. University of Adelaide encouraged their students to publish their project work in international conferences or journals. This not only encourages students to proceed to advanced studies but also increase the publication lists of universities (University of Adelaide, 2009; University of Western Australia, 2009; University of Newcastle, 2009b; University of Western Australia, 2009). However, smaller and newer universities, e.g. Swinburne University of Technology also did the same but it seems that this was limited to certain members of staff (Blicblau, 2007). It can be argued that smaller and newer universities should encourage publishing from their undergraduate final year projects because they had limited post-graduate students. Some

academics in smaller and newer universities tend to believe that publications in international journals require “rocket-science” projects; this is not true and they should try their best to publish to lift the publication profile of their universities.

The planned lectures carried out by University of Western Australia are excellent in guiding students through the difficult tasks of their research projects and it can be argued that other universities have to consider doing the same thing.

In both continents, final year engineering projects lead students to pay attention to the impact of technology on environment and society, health and safety issues as well as professional ethics.

## **Conclusion**

Whether it is in Australia or Europe, no one can deny the importance of final year engineering projects in the curriculum of professional engineer education and training. It can be argued that a project load of 6.25 % of total engineering degree load is a suitable one. All universities assess the final year engineering projects with literature survey, oral presentation and written reports or thesis but it can be argued that dissertation is more rigorous assessment method than its counterpart. Individual projects are best but the supervisory resources involved are very high and research projects tend not to be profitable in USQ so it is difficult to say whether this can be sustained indefinitely (Goh et al., 2009). The involvement of high school students in UniSA was innovative and it is worth extending to other universities in Australia and Europe. The use of final year project work for publications in international conferences and journals are to be encouraged as many of the projects are really innovative.

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**Table 1: Summary of the characteristics of final year engineering research projects of seven Australian universities.**

	<b>Assessment types</b>	<b>Assessment Method</b>	<b>Involvement of companies</b>	<b>Individual or team project</b>	<b>Time frame</b>	<b>Loading</b>	<b>Others</b>
<b>Swinburne</b>	Project proposal Engineering report or technical paper Presentation Poster preparation	Not mentioned Not mentioned  Reviewers Oral presentation Questioning	Some projects	Two or three	Two semesters	300 hours	NA
<b>UniSA</b>	Not mentioned	Not mentioned	Most projects	One to three	Two semesters	300 hours	High school students
<b>VU</b>	Theoretical components Project design Implementation Presentation	Examination  A major design Formal report Presentation	Not mentioned	Individual	Two semesters	5 hours per week	NA
<b>Newcastle</b>	Presentation Written report Work undertaken	In a seminar Thesis A public demo	Not mentioned	Individual or small group	Twelve months	300 hours	NA
<b>Adelaide</b>	Not mentioned	Not mentioned	Most projects	Individual or two to three	9 months	300-600 hours	NA
<b>UWA</b>	Project proposal Progress report Conference paper Presentation Written report	By supervisor By supervisor By supervisor In a conference Thesis	Some projects	Individual		300 hours	
<b>USQ</b>	Project proposal Project appreciation Written report Oral presentation	By supervisor By supervisor  Thesis Academic staff	Not many	Individual	Two semesters	310 hours	NA

**Table 2: Summary of the characteristics of final year engineering research projects of three European universities.**

	<b>Assessment types</b>	<b>Assessment Method</b>	<b>Involvement of companies</b>	<b>Individual or team project</b>	<b>Time frame</b>	<b>Loading</b>	<b>Others</b>
Granada	A study of alternatives Construction project Writing up	Public defence  Public defence  Not mentioned	Not mentioned	Not mentioned	Not mentioned	Not mentioned	NA
De Montfort	Presentation Written report Publication	Oral presentation Not specified Not specified	Some projects	Individual	Not mentioned	Not mentioned	NA
Høgskolen	Presentation  Written report	Oral presentation at EXPO Not specified	Most projects	Individual	Not mentioned		Partners in Germany

**Table 3: Swinburne attributes for capstone project**

To develop collaborative and team work skills.
To develop project management skills.
To develop skills in planning and executing an innovative project.
To undertake a major project and complete the task satisfactorily within time and budget
To develop an understanding of the processes of research
To demonstrate the ability to integrate knowledge and skills acquired during the course.
To develop advanced skills in literature review, report writing and oral presentation.
To develop skills in writing and presenting a major project report.
To demonstrate the ability to communicate by presenting a professional seminar

**Table 4: Formal Assessment of Final year Projects of Victoria University**

<b>Project contract</b>	<b>Weighting (%)</b>
Feasibility Study	5
Mid of First semester presentation	10
End of first semester presentation	10
Mid of second semester presentation	10
End of second semester presentation and demonstration	40
Final project report	25
Total Marks	100

**Table 5: Lecture Schedule for Final Year Engineering Project for students commencing semester 1, 2009 in the University of Western Australia**

<b>Semester 1</b>	
Friday, 27/2/09	Introduction to Final Year Project
Friday, 13/3/09	Literature Review Techniques
Friday, 27/3/09	Project Proposal Preparation and Grading
Friday, 10/4/09	Safety
Friday 1/5/09	Project Management
<b>Semester 2</b>	
Friday, 31/7/09	Project Update
Friday, 14/8/09	Conference Paper and Abstract Preparation
Friday, 28/8/09	Thesis Preparation and Grading
Friday, 18/9/09	Presentation Techniques
Thursday 15/10/09 & Friday 16/10/09	Final Year Conference

**Table 6: Formal Assessment of Final year Projects of University of Western Australia**

<b>Element</b>	<b>Assessed by</b>	<b>Weighting (%)</b>
Project Proposal	Supervisor	10
Progress Report	Supervisor	5
Conference Paper	Supervisor	10
Conference Presentation	2 Staff members but not supervisor	10
Thesis	At least 1 Panel member* but not supervisor	65

\*Thesis marking will be undertaken by a panel of 10-12 academic staff members. The panel membership is selected to ensure coverage of the focus areas and project types within the school (materials, design, mechatronics, chemical process, tribology etc).

**Table 7: Project Workload for students**

<b>Activity</b>	<b>Hours</b>
Private study	30
Project work	170
Dissertation writing	80
Supervisor consultation	30
Total hours	310

**Table 8: Assessment details of ENG4111/ENG4112**

<b>Description</b>	<b>Mark out of</b>	<b>Weighting (%)</b>
Assessment 1, Topic allocation	1.00	1.00
Assessment 2, Project specification	1.00	1.00
Assessment 3, Project appreciation	1.00	1.00
Assessment 4, Progress assessment	100.00	100.00
Partial draft dissertation	1.00	1.00
Project performance	100.00	100.00