UNIVERSITY OF WOLLONGONG

School of Mechanical, Materials and Mechatronic Engineering

18th January 2013

INFORMATION FOR MECHANICAL ENGINEERING STUDY PROGRAM IN 2013

Dear Mechanical Engineering Student

I hope 2012 was a successful and rewarding year for you and that you are enjoying the break away from university, whether you are on vacation or working (perhaps doing your professional experience at the end of third or fourth year).

The principal purpose of this letter is to let you know of some of the study program arrangements for next year – please keep this letter for future reference.

Significant Changes to the Engineering Management Subject stream:

From Autumn 2013 onwards ENGG361 will no longer be offered, however the majority of the content of this subject has been placed in a revised ENGG461 (new Subject name: Managing Engineering Projects). Students who have not yet done ENGG361 will take an elective in place of this subject in their 3rd year program (Spring Session), and do the new ENGG461 in their 4th year (Autumn Session). Students who have completed ENGG361 but not ENGG461 will NOT do the new ENGG461 (as this would mean a significant duplication of content), but replace this with an elective in that Autumn Session. Variations from this arrangement may be possible for students not currently following the standard program. It will be possible to take the new ENGG461 in 3rd year if your program permits – it is recommended that if considering this option that you discuss it with the discipline advisor.

A direct consequence of this change is that there is now an additional elective subject in your program. It is suggested that you consider selecting this additional elective from the broader range of Engineering Management electives that have been made available: including ENGG433 (Financial Management), ENGG440 (Strategic Management), ENGG439 (Operations Management), ENGG487 (Systems Analysis) and ENGG489 (Asset Management). This will maintain the important management component of your studies, while allowing you the flexibility to focus in a particular area. Of course, those who do not desire a 400 level Management elective can now opt for a 400 level technical elective instead.

Significant Changes to the Workshop Practice Activity:

The workshop practice activity (introduction to the use of basic machine shop equipment) is a compulsory part of the Mechanical and Mechatronic degree programs. Recently it has been completed by students in second year (an activity in either MECH252 of MECH215), previously it was completed in ENGG101 when discipline specific activities were part of that subject. Students only need to have completed this once (or have sought and been granted exemption of the activity on the basis of previous experience in that field).

From 2013 on a specific subject code: MECH203 Mechanical Workshop Practice has been created to administer this activity. It is a zero credit point, zero HECs charge subject that you must have included as being satisfied on your academic transcript in order to be eligible for graduation. In this respect it is the same as the ENGG454 Professional Experience subject.

It is intended that you complete this activity in 2nd year (hence the 200 level code) as it is an important background preparation for the design subjects that follow (it is vital in the design process to have an understanding of the issues and feasibility in the manufacture of a component you are designing).

If you have already completed the Workshop Practice Activity (as part of ENGG101, MECH252 or MECH215) or been granted exemption due to previous experience you still need to enroll in MECH203 and (providing you are on my list as having satisfied the requirements of this activity) your result for MECH203 will be set to "S" (satisfactory). If the grade for MECH203 is not set to "S" by the end of Autumn Session, but you believe it

should be, please contact me.

If you have not completed this activity and are in 2nd year, enroll in MECH203 and look for Sols mails informing you of the steps required to enroll in one of the sessions to complete the activity. Systems will be set up to allow you to enroll in one of the workshop activity groups that will complete the required tasks in the Student Project Space in Building 6 (SMART bldg). This is a hands-on activity giving you the opportunity to make components to drawing on professional workshop devices (lathes, mills etc). These groups will be spread across both Autumn and Spring Sessions to make effective use of the limited machine tools available.

There are minor changes in the thesis selection.
"From 2010 onwards students have a choice of enrolling in ENGG452 Thesis A (12 credit points) or ENGG456 Project A (6 credit points). Students who enrol in ENGG456 will be required to take an additional elective from the list of approved electives as listed for their degree. The project is intended for students who do not expect to get an Honours degree, and would like to broaden their study program. High achieving students will continue to have the option of enrolling in ENGG453 Thesis B (18 credit points). Note: to be eligible for Honours, students must complete either ENGG452 Thesis A (12 credit points) or ENGG453 Thesis B (18 credit points), in addition to having achieved the required WAM score. Please consult your Discipline Advisor if you have any questions about the new projects or honours."

Electives. We will continue to offer a range of elective subjects which reflect the broad range of career opportunities in Mechanical Engineering and which also reflect the strengths of the Mechanical Engineering Discipline at the University of Wollongong (eg Applied Mechanics, Bulk Materials Handling, Manufacturing, Sustainable Energy Technologies). The electives that acceptable in the program are grouped in two different lists. The approved technical or engineering electives are provided in list A – you may take all your electives from this list. List B contains the pre-approved electives from other faculties or disciplines. You may take up to two (2) electives from other faculties. Should you identify a subject not listed in either list A or B that you wish to take, you must seek approval from the Discipline Advisor before taking that subject and have that subject approved in writing by the Sub Dean as counting towards your degree. The actual engineering electives vary from year to year and are dependent on staff availability. The list of engineering electives that are expected to be on offer in 2013 and 2014 is provided below (page 7 & 8).

Timetabling. Details of the timetable and room allocations can be found on the web. Note that with the university-wide timetabling software, ***timetables are likely to change up until close to the start of semester – it is important that you check this information as the semester approaches.***

Pass Conceded Grade: From January 2012, the PC and PR grades will no longer be available. There will be a system established where students who are close to a pass grade may be offered a supplementary assessment. The following link contains further information on this change:
http://www.uow.edu.au/about/policy/alphalisting/UOW112434.html

Pass Conceded limit. I expect that the pass conceded limit will remain in order to meet graduation requirements. Please remember that there is a limit on the number of PC grades that you may have at graduation. The course rule 8.5.4 states "Subjects satisfactorily completed at a Pass Conceded or Pass Restricted grade may comprise no more than one sixth of the minimum credit point value of a course." – if you exceed this limit (32 credit points – i.e. ***if you have more than 5 subjects as PC***) you will have to retake one or more subjects (see the university handbook/website for more details).

Weighted Average Mark (WAM). *The best way to ensure that you get a good job following graduation is to maximise your WAM – employers judge students largely on academic performance***.** You should be aware that when you graduate your grade of honours is calculated from the weighted average of your performance in *every* subject you have attempted over the whole of your degree. *Employers will judge applicants for jobs by their grade of honours*, so it is important to maintain the highest performance you can throughout your degree. (Remember that each 6 credit point subject requires in the order of twelve (12) hours per week of study, including time in class, for a successful outcome). You can calculate your own WAM using the following formula:

$\text{WAM} = \dfrac{\sum MLC}{\sum LC}$; where C = credit point value of subject; L = Level (ie L=2 for MECH226); M = Mark (%).

The summation terms must include ***all*** subject attempts (including any failures). The grades of honour are then awarded as follows:

First Class honours: 77.5 < WAM < 100
Second Class, Division 1 honours: 72.5 < WAM < 77.5
Second Class, Division 2 honours: 67.5 < WAM < 72.5
The Third Class honours grade will no longer be awarded (previously for 62.5 < WAM < 67.5)
Pass Degree: WAM < 67.5

Scholars Program. Those students who maintain a WAM greater than 80 *(NB this is a change from the previous requirement of 75)* are eligible for the Scholars Program, which has benefits including the following:

- Scholars are eligible to take the 18 credit point Final Year Thesis option (ENGG453 Thesis B). In this project you can undertake a significant research activity that will help in providing the best possible platform for you to launch your career as a Professional Engineer following graduation.
- Final year Scholars may be given the opportunity to act as paid student mentors to first year students in the Opportunity Program. This not only gives you some extra cash, but also improves your understanding of your own discipline, since the best way to understand a subject is to explain it to someone else.
- Scholars are encouraged to discuss their study program with the Sub-Dean with a view to arranging a customised study program to suit a student's particular interests and abilities. For instance, we would encourage scholars to consider taking high-level analytical subjects (possibly at postgraduate level) from Mechanical Engineering, other Engineering/Science disciplines and in Mathematics (which is particularly important for those students considering a career in research or academia).
- Some research based subjects (ENGG171, ENGG271 and ENGG371) have been introduced as options for students in the Scholars Program. Proposals to undertake these subjects should be discussed with the Sub-Dean.

Professional Experience. As you are no doubt aware there is a requirement that 12 weeks of professional experience be completed satisfactorily as part of the Bachelor of Engineering degree program (a requirement from the Institution of Engineers as part of the accreditation of the course). This is included in the course as the ENGG454 subject (zero credit points), in which you should enroll, in the session that you intend to submit the report for this professional experience. Ideally this work experience would be completed between years 3 and 4, however you should also consider taking advantage of any suitable opportunities earlier. Your graduation will be delayed until this component is complete, hence if it is left to the end of 4th year, you will be unable to graduate in the December graduation ceremony of that year. It is *your* responsibility to find Professional Experience work. The Engineers Australia office (ground floor Building 8 may be able to give you a list of possible local companies).

Remember if you are in 3rd year in 2013 – ***apply for Professional Experience positions early*** (put it in your diary to apply for posts early in Spring Semester – there is always a lot of competition for these opportunities). You should discuss any professional experience placement you are considering with the coordinator for this "subject" (Dr Devi Saini) to ensure that it meets the relevant criteria. It is important that you confirm the suitability of the position in advance to avoid the considerable difficulty and disappointment that arises if your 12 week work experience does not meet the requirements. An information pack detailing the requirements for ENGG454 (including forms that need to be completed by prospective employer and the ENGG454 coordinator <u>before the work placement commences</u>) are available from the Engineering Enquiries Centre. From time to time there may be some information on possible placement opportunities posted on the notice boards or distributed by email.

Engineers Australia is our Professional Body and you can join as a student member and get many benefits and significant assistance. Eventually you will be certified as a professional engineer by this body so it is a good idea to get involved early on. See Elaine Bailey in the Engineers Australia Office on the ground floor of Building 8.

To assist you in finding out where you are in your degree program, I have also attached a copy of a *degree map* illustrating how all the subjects are linked by pre- and co-requisites and some examples of links for prior knowledge. *If you have any doubt at all about your program for 2013 please contact me*.

I would like to take this opportunity to draw your attention to the Mechanical Engineering Society. The society has a wide range of activities over the course of the year. It is a place where you may interact with other mechanical engineering students from different years. I encourage you all to join the society and support its activities throughout 2013.

In closing I would like to join with all academic and support staff in wishing you the very best for the New Year - we look forward to seeing you again in 2013.

Dr Oliver Kennedy
Discipline Advisor – Mechanical Engineering,
School of Mechanical, Materials and Mechatronic Engineering
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2013 BE (Mechanical) DEGREE - FULL TIME PROGRAMME

(Each subject listed = 6 Credit Points/semester)

Autumn Session	Spring Session
First Year	
ENGG101 Foundations of Engineering	ENGG152 Engineering Mechanics
ENGG153 Engineering Materials	ENGG154 Engineering Design and Innovation
MATH141 Foundations of Engineering Mathematics*	MATH142 Essentials of Engineering Mathematics*
CHEM103 Chemistry for Engineers	PHYS143 Principles of Physics for Engineers
Second Year	
ENGG252 Engineering Fluid Mechanics	MECH215 Fundamentals of Machine Component Design
ENGG251 Mechanics of Solids	MECH226 Machine Dynamics
MECH252 Engineering Experimentation and Thermodynamics	ECTE290 Fundamentals of Electrical Eng.
MATH283 Mathematics 2E Part 1	MECH201 Engineering Analysis
Third Year	
MECH321 Dynamics of Engineering Systems	MECH311 Mechanical Engineering Design
MECH341 Thermodynamics	MECH343 Heat Transfer & Aerodynamics
MECH372 Solids Handling and Process Engineering	MECH365 Control of Machines & Processes
MECH382 Manufacturing Engineering Principles	MECH4xx Elective
Fourth Year	
ENGG452 Thesis A or ENGG456	ENGG452 Thesis A or MECH4xx Elective
ENGG461 Managing Engineering Projects	MECH4xx Elective
MECH419 Finite Element Methods in Engineering	MECH4xx Elective
MECH4xx Elective	MECH4xx Elective

- Required total number of credit points = 192
- *MATH187/188 is available as an alternative for some students entering with a high level of mathematics.
- Students must enroll in MECH203 (Workshop Practice Activity) in 2nd year and then self-enroll in one of the groups to complete this activity (see detailed comments on pages 1 and 2 regarding this). MECH203 is a zero credit point, zero HECs charge subject.
- Students must complete 12 weeks of approved and certified **Professional Experience** (ENGG454) – students should enroll in ENGG454 for either the session in which they wish to submit their report or for the last session of their degree. ENGG454 is a zero credit point, zero HECs charge subject.
- ENGG452 Thesis A is a 12-credit point annual subject. A similar 18-credit point subject, ENGG453 Thesis B, will be available to students in the Scholars Program (ie students with WAM>75.0). Scholars will take one less elective. Students may commence their thesis in Spring Session if they wish (see the Thesis Coordinator for further details).
- MECH419 is an elective subject for students who commenced the course prior to 2009; it is a core subject for all other students.

2013 BE (Mechanical) DEGREE - PART TIME PROGRAMME

(Each subject listed = 6 Credit Points/semester)

Stage	Autumn Session	Spring Session	CP
1	MATH141 Foundations of Engineering Mathematics* ENGG101 Foundations of Engineering	MATH142 Essentials of Engineering Mathematics* PHYS143 Principles of Physics for Engineers	24
2	CHEM103 Chemistry for Engineers ENGG153 Engineering Materials	ENGG152 Engineering Mechanics ENGG154 Engineering Design and Innovation	24
3	MECH252 Engineering Experimentation and Thermodynamics ENGG251 Mechanics of Solids	MECH215 Fundamentals of Machine Component Design MECH226 Machine Dynamics	24
4	ENGG252 Engineering Fluid Mechanics MATH283 Mathematics IIE Part 1 ENGG255 Professional Option 2	MECH201 Engineering Analysis ECTE290 Fundamentals of Electrical Eng ENGG355 Professional Option 2	30
5	MECH341 Thermodynamics MECH321 Dynamics of Engineering Systems ENGG355 Professional Option 3	MECH343 Heat Transfer & Aerodynamics MECH365 Control of Machines and Processes ENGG355 Professional Option 3	30
6	MECH372 Bulk Solids Handling Technology MECH382 Manufacturing Engineering Principles ENGG455 Professional Option 4	MECH311 Mechanical Engineering Design MECH4xx Elective ENGG455 Professional Option 4	30
7	ENGG452 Thesis ENGG461 Managing Engineering Project MECH419 Finite Element Methods in Engineering	ENGG452 Thesis MECH4xx Elective	30

- Total number of credit points = 192.
- *MATH187/188 available as an alternative for some students with a high level of mathematics on entry.
- Each six-credit point Professional Option subject is credited as one elective - up to a maximum of 3 electives.
- Students must enroll in MECH203 (Workshop Practice Activity) in 2nd year and then self-enroll in one of the groups to complete this activity (see detailed comments on pages 1 and 2 regarding this). In many cases work experience for part-time studetns (for example BlueScope cadets) will permit exemption from this activity, however you still to enroll in MECH203 to have this requirement recorded as being satisfied. MECH203 is a zero credit point, zero HECs charge subject.
- Students must complete 12 weeks of approved and certified **Professional Experience** (ENGG454) – students should enrol in ENGG454 for either the session in which they wish to submit their report or for the last session of their degree. Students who complete at least one Professional Option are not required to complete ENGG454. ENGG454 is a zero credit point, zero HECs charge subject.
- ENGG452 Thesis A is a 12-credit point annual subject. A similar 18-credit point subject, ENGG453 Thesis B, will be available to students in the Scholars Program (ie students with WAM>75.0). Scholars will take one less elective.
- Students may commence their thesis in Spring Session if they wish (see the Thesis Coordinator for further details).

<u>The list of electives acceptable in the program.</u>

List A

CIVL311	Structural Design 1
CIVL314	Structural Design 2
CIVL322	Hydraulics and Hydrology
CIVL463	Applied Geotechnical Engineering
ECTE471	Robotics and Flexible Automation
ENGG378	Sustainable Energy Technologies
ENGG433	Financial management for Engineers
ENGG434	Introduction to Materials Welding and Joining
ENGG477	Ocean Engineering
ENVE221	Air and Noise Pollution Control Engineering
MATE302	Polymeric Materials
MATE401	Selection of Materials in Engineering Design
MECH409	Micro/Nano Robotic Systems
MECH421	Manufacturing Process Analysis
MECH422	Design and Analysis of Manufacturing Systems
MECH423	Design for Manufacturing
MECH424	Managing Manufacturing Activities
MECH426	Storage and Flow of Bulk Solids
MECH427	Mechanical Conveying of Bulk Solids
MECH428	Pneumatic Conveying and Dust Control
MECH429	Physical Processing of Bulk Solids
MECH430	Automotive Dynamics
MECH431	Computational Fluid Dynamics
MECH438	Fluid Power
MECH442	Sustainable Energy in Buildings
MECH468	Computer Control of Machines and Processes
MECH474	Reliability Engineering
MECH479	Sustainable Transport & Engine Technologies
MECH487	Systems Analysis for Maintenance Management
MECH488	Introduction to Condition Monitoring in Mechanical Engineering
MECH489	Engineering Asset Management

LIST B

BMS112	Human Physiology 1: Principles and Systems
ECON101	Macroeconomic Essentials for Business
ECON111	Introductory Microeconomics
ECTE233	Digital Hardware 1
ERLS100	Intro. To Employment Relations and Labour Studies
FREN151	French 1A Language
INDO151	Introductory Indonesian 1A
INTS375	Global Labour Studies
ITAL151	Italian 1A Language
JAPA141	Beginner's Japanese 1
LAW101	law, Business and Society
MAND151	Chinese (Mandarin) for Beginners 1A
PHIL206	Practical Ethics
PHIL256 or 258	Ethics and the Environment
SPAN151	Spanish for Beginners 1
STS218	Environment in Crisis
STS300	The Environmental Context

ELECTIVES (*only a selection will run in a given year* - refer to the University on-line calendar for details, pre-requisite requirements and session of offer)

The subjects provided in List A are the standard engineering technical electives. You would normally 5 subjects from this list to complete the requirements for your B E (mech) degree.

It is possible, however, to have up to 2 subjects selected from outside the standard program to count towards the 192 credit points required for your degree.

Up to two (2) external subjects (from List B) may be taken by full time students in lieu of electives in the Mechanical Engineering program in List A (part-time students who complete one or more professional options may complete only one (1) external subject). The subjects presented in List B are pre-approved as eligible electives. If you identify a subject that you wish to take that is not on List B, you must first obtain written approval from the Sub-Dean by applying in writing with reasons/justification as to why you wish to take a subject external to the list above. Failure to do this may result in delay in graduation and added expense. This opportunity is available so that students can broaden their education and/or extend their technical skill and knowledge bases in inter-disciplinary studies. Subjects taken from other departments must not duplicate any material already present in the above program. Discussing your plans with the discipline advisor would be a good first step before making an application to the Sub-Dean.

List of Engineering Electives offered in 2014 (this list may change before the start of semester - please check the University website for more information on the subject content and objectives, etc)

Please note that only electives with sufficient enrolments will run – so you should *enroll as soon as possible* to ensure that your electives of choice have the maximum enrolment.

2013 Autumn Session

Subject	*Name*	*Coordinator/Lecturers*
ENGG202*	Introduction for F SAE Project	Dr Oliver Kennedy
ENGG440	Strategic Management of Engineering	A/Prof Peter Gibson
MECH419**	Finite Element Methods in Engineering	Dr Buyung Kosasih Prof Kiet Tieu
MECH421	Manufacturing Process Analysis	Prof Kiet Tieu
MECH428	Pneumatic Conveying and Dust Control	A/Prof Peter Wypych
ENGG474	Reliability Engineering	A/Prof Richard Dwight
MECH489	Engineering Asset Management	A/Prof Richard Dwight

** Annual subject to prepare students joining the F SAE Team, manual enrollment, contact Dr Oliver Kennedy if interested*
*** MECH419 is a core subjects for students commencing on or after 2009*

2013 Spring Session

Subject	*Name*	*Coordinator/Lecturers*
ENGG202*	Introduction for F SAE Project	Dr Oliver Kennedy
ECTE471	Robotics and Flexible Automation	A/Prof Weihua Li + ECTE staff
ENGG378	Sustainable Energy Technologies	Dr Brad Stappenbelt
ENGG433	Financial Management for Engineers	External
ENGG434	Intro to Materials Welding and Joining (by flexible delivery – i.e. not timetabled)	Dr Muruganant Marimuthu
ENGG439	Engineering Logistics and Operations Management	Dr Senevi Kiridena
MATE401	Selection of Materials in Engineering Design	Dr Philip Whitten
MECH423	Design for Manufacturing	Dr Devi Saini
ENGG470	Applied Topics in Mechatronics	Dr Emmanuel Blanchard
MECH430	Automotive Dynamics	Dr Oliver Kennedy Prof Weihua Li
MECH487	Systems Analysis for Maintenance Management	A/Prof Richard Dwight

** Annual subject to prepare students joining the F SAE Team, manual enrollment, contact Dr Oliver Kennedy if interested*

Electives anticipated being on offer in 2014

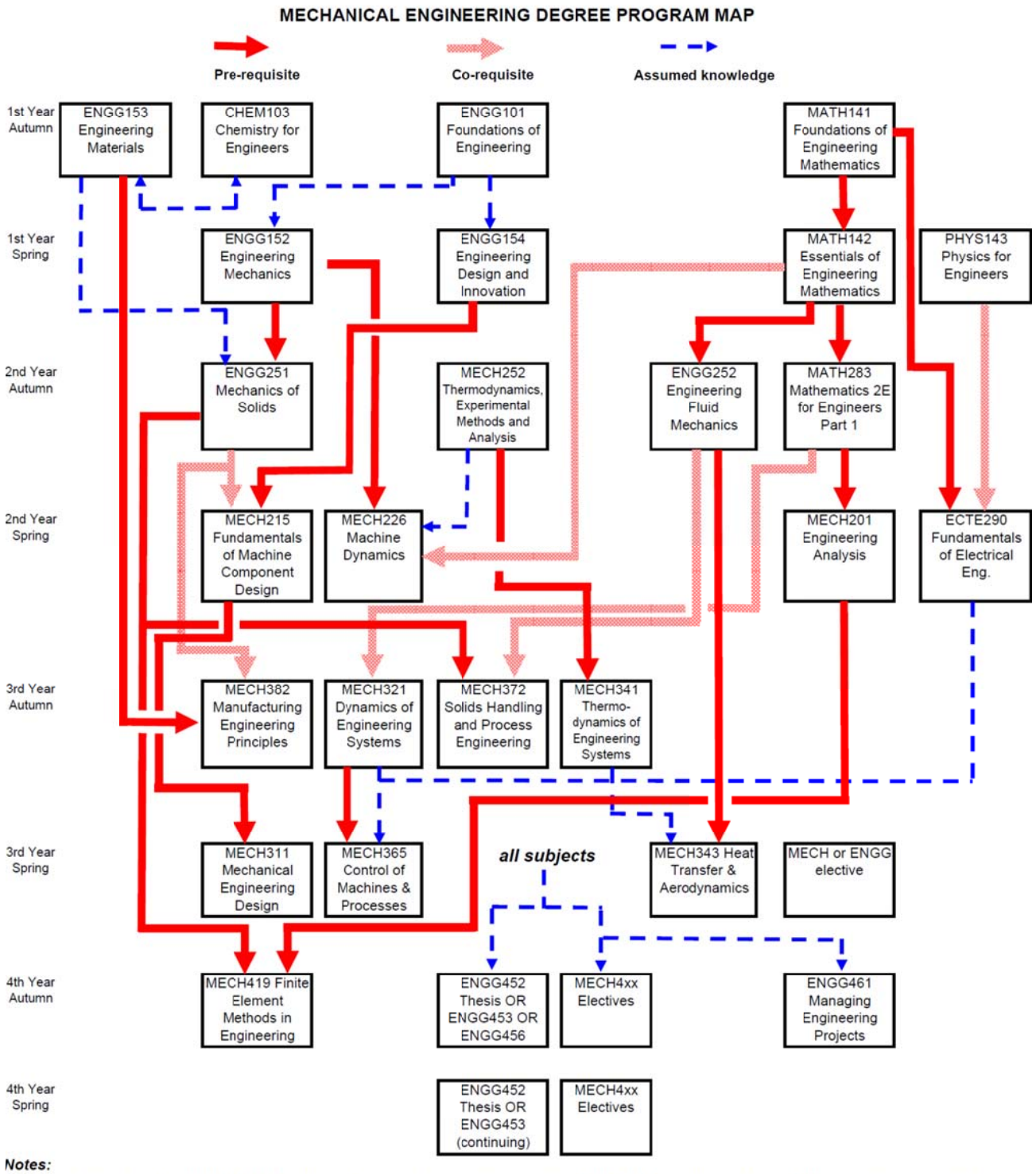
2014 Autumn Session

Subject	*Name*	*Coordinator/Lecturers*
ENGG446	Energy Efficiency and Energy Auditing in the Built Environment	Dr Lan Ding, Dr Zhenjun Ma
MECH409	Micro/Nano Robotic Systems	Dr Emmanuel Blanchard Prof Weihua Li
MECH419*	Finite Element Methods in Engineering	Dr Buyung Kosasih Prof Zhengyi Jiang
MECH421	Manufacturing Process Analysis	Prof Kiet Tieu, Dr Cheng Lu
MECH426	Storage, Flow & Mechanical Conveying of Bulk Solids	Dr David Hastie, A/Prof Peter Wypych
MECH468	Computer Control of Machines & Processes	Dr Emmanuel Blanchard
MECH489	Engineering Asset Management	A/Prof Richard Dwight

** MECH419 is a core subjects for students commencing on or after 2009*

2014 Spring Session

Subject	*Name*	*Coordinator/Lecturers*
ECTE471	Robotics and Flexible Automation	A/Prof Weihua Li + ECTE staff
ENGG378	Sustainable Energy Technologies	Dr Buyung Kosasih Dr Brad Stappenbelt
ENGG433	Financial Management for Engineers	External
ENGG434	Intro to Materials Welding and Joining (by flexible delivery – i.e. not timetabled)	Dr Muruganant Marimuthu
ENGG447	Advanced Building Design for Energy Efficiency and Sustainability	Dr Lan Ding, Dr Zhenjun Ma
ENGG448	Energy Efficiency in Manufacturing and Process Industries	Dr Zhenjun Ma
MATE401	Selection of Materials in Engineering Design	Prof Geoff Spinks
MECH423	Design for Manufacturing	Dr Devi Saini
MECH479	Sustainable Transport and Engine Technology	Dr Oliver Kennedy
MECH487	System Analysis for Maintenance Management	A/Prof Richard Dwight



Notes:

5 electives are required if ENGG452 (12 CP) thesis project is completed, 4 electives if ENGG453 is completed, and 6 if ENGG456 is completed.
Overall academic performance may restrict which of these thesis/project options are available to a student.
Electives may be taken from 3rd year on in order to increase the choice available to students. However students need to consider any impact this may have on their overall program (for example flowing from pre and co-req linkages between subjects) that may arise as a result.

NOTE: *this map is a guide only*; pre-requisites and co-requisites should be checked on the University website before enrolling in subjects.