School of Engineering
Faculty of Science, Engineering and Technology

KNE113
Engineering Statics

First Semester, 2012

Unit Outline

Dr Hui Jiao

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Contact details

Unit coordinator/lecturer

Unit Coordinator/Lecturer: Dr Hui Jiao
Campus: Hobart
e-mail: hjiao@utas.edu.au
Phone: (03) 6226 2115
Fax: (03) 6226 7247
Room number: 210
Consultation hours: 9am - 5pm weekdays

Other teaching staff

Tutorial and Lab Demonstrator: Mr Daniel Hugo
Email: hugos5@bigpond.com

Peer Assisted Study Sessions (PASS)

The Peer Assisted Study Sessions (PASS) program is an academic support program, available to all students studying in KNE113. PASS offers regular, out-of-class sessions to help students achieve the intended learning outcomes of this unit. PASS commences in week 2 of semester one.

PASS Leaders: Mr. Stuart Ednie
Mr. Jack Terry

Please check session time and location on the web site: http://www.learningsupport.utas.edu.au/PASS/ttables.htm

Scheduled Contact

<table>
<thead>
<tr>
<th>Lectures</th>
<th>Monday</th>
<th>9-10am</th>
<th>Eng 201</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Wednesday</td>
<td>12-1pm</td>
<td>Eng 201</td>
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<tr>
<td></td>
<td>Friday</td>
<td>12-1pm</td>
<td>Eng 201</td>
</tr>
<tr>
<td>Tutorials*</td>
<td>Monday</td>
<td>12-1pm</td>
<td>UniCentre 103</td>
</tr>
<tr>
<td></td>
<td>Tuesday</td>
<td>10-11am</td>
<td>Eng 207</td>
</tr>
<tr>
<td>Laboratory</td>
<td>TBA</td>
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<td>Structures Lab</td>
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</tbody>
</table>

* Note: Tutorials start from Week 2.
Unit description

The main objective of this unit is to develop in students the ability to analyse engineering statics problems in a simple and logical manner through the application of several basic principles. It will consolidate the fundamental concepts of Newton’s Mechanics learnt by students in physics courses during their college studies. It also aims to provide students with the ability to make an informed decision about what a career in civil engineering might entail.

The unit covers fundamental concepts and principles of engineering mechanics - statics. The unit is a pre-requisite for KNE151 Engineering Dynamics and KNE216 Civil Engineering 1, core units in Civil, Mechanical, Mechatronic and Civil/Mining specialisations.

Learning outcomes

Engineering Statics focuses on the introduction of fundamental mechanics. The unit is designed to support you in developing basic knowledge and skills as outlined in the following intended learning outcomes:

- To apply knowledge to the equilibrium analysis of forces and rigid bodies
- To draw axial force, shear force and bending moment diagrams
- To analyse hydrostatic forces on rigid bodies
- To analyse internal forces in members of trusses and frames
- To calculate centres of gravity and area moments of inertia

Generic graduate attributes

The University has defined a set of generic graduate attributes (GGAs) that can be expected of all graduates. By undertaking this unit you should make progress in attaining the following attributes:

Knowledge:

- ability to apply knowledge of basic science and engineering fundamentals;
- in-depth technical competence in at least one engineering discipline;

Communication skills:

- ability to communicate effectively, not only with engineers but also with the community at large via a thorough understanding of fundamental principles and through teamwork exercises;

Problem-solving skills:

- ability to undertake problem identification, formulation and solution;
Alterations to the unit as a result of student feedback

There are three alterations to the unit as a result of student feedback. 1. Two tutorial sessions are scheduled with one tutorial to be given by a teaching staff other than the lecturer. 2. The lab report marks are increased from 9% to 15%. 3. A new text book is selected.

Prior knowledge &/or skills

You are required to have studied Physical Science and have a background in physics and mathematics applicable to solving engineering mechanics problems. This includes trigonometry and calculus.

Text, references and learning resources

Text


Recommended reading


E- (electronic) resources

This unit outline, tutorial problems and solutions will be made available on MyLO.

Library

Several copies of the recommended books will be available in the Science Library.

For MyLO

To access MyLO from your own computer you will need the appropriate software, and hardware to run that software. Please see UConnect at http://uconnect.utas.edu.au/ for information about computer software you will need.

See MyLO: Information for Students for further information about accessing MyLO.

Details of teaching arrangements

Lectures

Three hours Lectures will be delivered each week. Lecture times in week 13 will be used for revision.
**Tutorials**
A weekly tutorial will be used to support lecturing. It aims to develop students’ problem solving skills.

**Laboratories**
There will be three (3) experiments during the semester. Details of these will be available on MyLO.

**Field trip/Guest Lecture**
A field trip will be announced during semester. The aim of this is to provide students interesting and relevant applications of engineering design. A one page report detailing key learning objectives will be required from the field trip.

There will be a guest lecturer to talk about how engineers solve real world engineering problems.

**Unit schedule***

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27, 29 Feb, 2 Mar</td>
<td>Introduction, equilibrium of concurrent forces</td>
</tr>
<tr>
<td>2</td>
<td>5, 7, 9 Mar</td>
<td>Resultant and components of forces</td>
</tr>
<tr>
<td>3</td>
<td>14, 16 Mar</td>
<td>Moments, couples and equivalent systems of forces</td>
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<tr>
<td>4</td>
<td>19, 21, 23 Mar</td>
<td>Distributed forces</td>
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<tr>
<td></td>
<td></td>
<td>Guest lecture</td>
</tr>
<tr>
<td>5</td>
<td>26, 28, 30 Mar</td>
<td>Hydrostatics</td>
</tr>
<tr>
<td>6</td>
<td>2, 4, 13 Apr</td>
<td>Type of supports</td>
</tr>
<tr>
<td>7</td>
<td>16, 18, 20 Apr</td>
<td>Reactions of rigid bodies</td>
</tr>
<tr>
<td>8</td>
<td>23, 27 Apr</td>
<td>Equations of Internal forces</td>
</tr>
<tr>
<td>9</td>
<td>30 Apr, 2, 4 May</td>
<td>Internal forces diagrams of beams</td>
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<tr>
<td>10</td>
<td>7, 9, 11 May</td>
<td>Internal forces diagrams of simple frames</td>
</tr>
<tr>
<td>11</td>
<td>14, 16, 18 May</td>
<td>Analysis of trusses</td>
</tr>
<tr>
<td>12</td>
<td>21, 23, 25 May</td>
<td>Centroid and area moment of inertia</td>
</tr>
<tr>
<td>13</td>
<td>28, 30 May, 1 June</td>
<td>Revision</td>
</tr>
</tbody>
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*The unit schedule above may alter to accommodate conflicts with other University duties.*
Learning expectations and strategies

Expectations
The University is committed to high standards of professional conduct in all activities, and holds its commitment and responsibilities to its students as being of paramount importance. Likewise, it holds expectations about the responsibilities students have as they pursue their studies within the special environment the University offers.

The University’s Code of Conduct for Teaching and Learning states:

Students are expected to participate actively and positively in the teaching/learning environment. They must attend classes when and as required, strive to maintain steady progress within the subject or unit framework, comply with workload expectations, and submit required work on time.

Learning strategies
Attending lectures and tutorials is highly recommended. The material covered in lectures will not be made available in electronic form. A bullet point summary of relevant content may be provided in some cases – but this will not be complete lecture notes.

If you do not understand something in lectures or tutorials, please ask for clarification in the lecture if need be, or immediately after the lecture if your question can wait until then. Asking questions is part of the learning process and it is strongly encouraged.

Specific attendance / performance requirements
The Faculty of Science, Engineering and Technology states that all students must attend a minimum of 2/3rds of all lectures and tutorials. This policy may be viewed at http://fcms.its.utas.edu.au/files/policies/Faculty%20Assessment%20Guidelines%20Nov%202004.pdf

Attendance and completion of all laboratory work is mandatory.

Assessment
The assessment will comprise of the following tasks:

- 10 weekly assignments (each worth 2%) = 20%
- 3 Laboratory Reports (each worth 5%) = 15%
- One site visit report = 5%
- One 3 hour end of semester Exam = 60%
How your final result is determined

Your final result will be determined from the aggregate of the internal assessment results (assignments, lab and site visit reports) and the results from the end of semester exam. You must achieve a minimum of 40% in both of your internal and final exam marks, and a final aggregate mark of 50% or greater to pass the unit. Refer to the following web site for detailed grading information:


Submission of assignments

Answers to assignments should be submitted online. Lab reports must be submitted to the KNE113 assignment box located adjacent to the School of Engineering Office by the specified due date.

Requests for extensions

All requests for extensions should be submitted via email to Dr Hui Jiao WELL BEFORE the due date of the assignment (hjiao@utas.edu.au).

Penalties

Unless an extension has been granted in writing, a penalty of 100% of the awarded mark will be deducted for a missed submission deadline.

Review of results and appeals

It is expected that students will adhere to the following policy for review of any piece of continuous assessment.

1. Within 5 days of the release of the assessment result, the student should request an appointment with the Lecturer. The student should be prepared to discuss specifically which section of the marking criteria they are disputing and why they consider the mark is inappropriate.

2. Following this discussion, students may request a formal remark of the original submission (in accordance with Rule of Academic Assessment 111, clause 22.1). This remark will be undertaken, where practicable, by an alternative assessor.

Students may also request a review of the final result in a unit. The request and payment must be made within 10 days from the date of the result notification. Students are referred to Rule of Academic Assessment 111, clause 23 at http://www.utas.edu.au/university-council/university-governance/rules and http://www.studentcentre.utas.edu.au/examinations_and_results/results/result_review_results.htm.

It is expected that students will adhere to the following policy for making any complaint or grievance directly related to a Unit:

1. In the first instance, students are to approach the Lecturer or Unit Coordinator concerned and arrange a time to speak with them about their concern.
2. If an issue remains unresolved, the student should approach the Head of School and arrange a time to speak with them about their concern. If the School's internal policy of complaints is unable to resolve an issue, students should consult Ordinance 8 Student Complaints for further direction, see http://acserv.admin.utas.edu.au/complaints_info.html

Feedback

Students should expect feedback in a timely manner. Every effort will be made to return tutorials in the week after submission. Students should attend PASS sessions to gain assistance in learning skills.

Academic referencing

In your written work you will need to support your ideas by referring to scholarly literature, works of art and/or inventions. It is important that you understand how to correctly refer to the work of others and maintain academic integrity.

Failure to appropriately acknowledge the ideas of others constitutes academic dishonesty (plagiarism), a matter considered by the University of Tasmania as a serious offence.

The required referencing style for this unit is APA. The Library has information about how to reference in this style

Plagiarism

Plagiarism is a form of cheating. It is taking and using someone else's thoughts, writings or inventions and representing them as your own; for example, using an author's words without putting them in quotation marks and citing the source, using an author's ideas without proper acknowledgment and citation, copying another student's work.

If you have any doubts about how to refer to the work of others in your assignments, please consult your lecturer or tutor for relevant referencing guidelines, and the academic integrity resources on the web at http://www.utas.edu.au/tl/supporting/academicintegrity/index.html.

The intentional copying of someone else's work as one's own is a serious offence punishable by penalties that may range from a fine or deduction/cancellation of marks and, in the most serious of cases, to exclusion from a unit, a course or the University. Details of penalties that can be imposed are available in the Ordinance of Student Discipline – Part 3 Academic Misconduct, see http://www.utas.edu.au/universitycouncil/legislation/

The University and any persons authorised by the University may submit your assessable works to a plagiarism checking service, to obtain a report on possible instances of plagiarism. Assessable works may also be included in a reference database. It is a condition of this arrangement that the original author’s permission is required before a work within the database can be viewed.
For further information on this statement and general referencing guidelines, see http://www.utas.edu.au/plagiarism/ or follow the link under ‘Policy, Procedures and Feedback’ on the Current Students homepage.

**Occupational health and safety (OH&S)**

The University is committed to providing a safe and secure teaching and learning environment. In addition to specific requirements of this unit you should refer to the University’s policy at: http://www.admin.utas.edu.au/hr/ohs/pol_proc/ohs.pdf.

As standard practice, you must wear clothes appropriate for laboratory work. You will be asked to leave the laboratory if you turn up wearing thongs, shorts, or a T-shirt !! As per your workshop practices sessions, you must wear proper shoes, jeans or trousers, and long-sleeve shirts to protect against spillage or abrasion, and avoid wearing ties or scarves that can get caught in machinery. Any loose clothing or long hair should be suitably restrained.

The School of Engineering issues a document to all students outlining its OH&S policy for the School’s Laboratories and Workshops. It is a requirement that all students must have read this document prior to entering any of the School’s workshops or laboratories.

Students and staff working in the Civil & Mechanical Engineering laboratories are required to conform to the following dress requirements:

Protective footwear conforming with AS2210 having protective toe caps, full length trousers, tight fitting protective long sleeve jacket or coat, no loose clothing or hair.

**Further information and assistance**

If you are experiencing difficulties with your studies or assignments, have personal or life planning issues, disability or illness which may affect your course of study, you are advised to raise these with your lecturer in the first instance.

There is a range of University-wide support services available to you including Teaching & Learning, Student Services, International Services. Please refer to the Current Students homepage at: http://www.utas.edu.au/students/

Should you require assistance in accessing the Library visit their website for more information at http://www.utas.edu.au/library/