



The University of Southern Queensland

Course Specification

Description: Design of Machine Elements

Subject	Cat-Nbr	Class	Term	Mode	Units	Campus
MEC	2301	14604	2, 2002	ONC	1.00	TWMBA

Academic Group:	FOENS
Academic Org:	FOES02
HECS Band:	2
ASCED Code:	030701

STAFFING

Examiner: Selvan Pather

Moderator: Chris Snook

PRE-REQUISITES

Pre-requisite: MEC 2402 or MEC 2404 and MEC2401 or MEC2405

SYNOPSIS

Design is one of the most important engineering functions for it is through design that new products and processes are born and that old ones are improved. Design requires a breadth of knowledge extending over many areas, and a sound analytical ability. It requires an ability to recognise the phenomena involved and to synthesise an integrated solution. Design requires sound engineering judgement as well as a good grasp of the underlying basic science and mathematics. This course aims to integrate the knowledge that the student has gained earlier in their course and to focus the student's analytical skills towards synthesis of solutions by working through the design of several simple, commonly used devices.

OBJECTIVES

On completion of this course, students should be able to:

- identify appropriate analytical models to describe and predict the behaviour of standard machine components;
- reduce the behaviour of a complex machine into appropriate sub- systems/elements and then analyse the behaviour of their elements;
- apply stress analysis theory, fatigue theory and appropriate criteria of failure to the design of simple machine elements;
- analyse and evaluate forces and stresses within a spur gear system;
- design simple power transmission systems;
- select appropriate mechanical components from manufacturers' catalogues;
- design springs, plain bearings and fluid seals;

- specify the appropriate use of adhesives;
- apply codes and standards to machine component design;
- communicate the results of a design assignment by means of drawings and a design report;
- make appropriate use of available computer aided design software.

TOPICS

Description	Weighting (%)
1. Stress Concentration	5.00
2. Fracture	5.00
3. Fatigue	10.00
4. Buckling	10.00
5. Threaded Fasteners and Power Screws	15.00
6. Rivetted Welded and Bonded Joints	5.00
7. Springs	5.00
8. Bearings	10.00
9. Belt and Chain Drives	5.00
10. Spur Gears	10.00
11. Shafts and Shaft Fittings	10.00
12. Brakes and Clutches	10.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED:

Books can be ordered by fax or telephone. For costs and further details use the 'Book Search' facility at <http://bookshop.usq.edu.au> by entering the author or title of the text.

MEC2301 Design of Machine Elements Study Book and Solutions Manual, USQ Publication,
SAA HB6 - 1999 Design Standards for Mechanical Engineering Students, Standards Association of Australia.

Juinall, R. C. & Marshek, K. M. 1999, *Fundamentals of Machine Component Design*, 3rd edition, Jacaranda Wiley,

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Deutschman, A. D., Michels, W. J. & Wilson, C. E. 1989, *Machine Design Theory and Practice*, MacMillan,

Shigley, J. E. 1986, *Mechanical Engineering Design*, McGraw Hill,

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	26
Examinations	3
Lectures	39
Private Study	74
Tutorial	13

ASSESSMENT DETAILS

Description	Marks Out of	Wtg(%)	Required	Due Date
ASSIGNMENT 1	200.00	20.00	Y	13 Sep 2002
ASSIGNMENT 2	200.00	20.00	Y	18 Oct 2002
3 HOUR OPEN EXAMINATION	600.00	60.00	Y	END S2 (see note 3)

NOTES:

3. Student Administration will advise students of the dates of their examinations during the semester.

OTHER REQUIREMENTS

- 1 To receive a passing grade in this course a student must normally achieve at least 40% in each of the assessments and at least 50% of the available marks for the course.
- 2 The final grades for students will be assigned on the basis of the aggregate of the marks obtained for each of the assessments in the course. The cut off mark for higher grades will normally be 50% for C, 65% for B, 75% for A and 85% for HD.
- 3 This is a COMMUNICATION BENCHMARK course and a major component of the assessment of this course will be associated with the demonstration of communication skills.
- 4 A minimum standard of communication skills must be demonstrated in order for a passing grade to be achieved.
- 5 The due date for an assignment is the date by which a student must submit the assignment to the USQ. The onus is on the student to provide proof of the submit date, if requested by the Examiner.
- 6 Students must retain a copy of each item submitted for assessment. This must be produced within five days if required by the Examiner.
- 7 In accordance with University's Assignment Extension Policy (Regulation 5.6.1), the examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.
- 8 If students submit assignments after the due date without prior approval then a penalty of up to 10% of the total marks for the assignment will apply for each working day late.

- 9 In the event that a due date for an assignment falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.
- 10 The Faculty of Engineering and Surveying will NOT accept submission of hand written or typed assignments by facsimile, e- mail or computer diskette. Students in remote locations who do not have regular access to postal services may be given special consideration.
- 11 An open examination indicates that the candidate may have access to any material during the examination except the following : electronic communication devices, bulky materials, devices requiring mains power and material likely to disturb other students.
- 12 The Faculty of Engineering and Surveying does not offer supplementary examinations.
- 13 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study.
- 14 Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination; IDM (Incomplete Deferred Make-up; IDSM (Incomplete Deferred Examination and Make-up).
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