The University of Southern Queensland

Course specification

This version produced 20 Dec 2007.
The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.
Please consult the web for updates that may occur during the year.

Description: Design of Machine Elements

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
MEC	2301	66396	2, 2007	EXT	1.00	Toowoomba

Academic group: FOENS
Academic org: FOES02
Student contribution band: 2
ASCED code: 030701

STAFFING

Examiner: Chris Snook
Moderator: Jayantha Epaarachchi

REQUISITES

Pre-requisite: MEC2402

OTHER REQUISITES

Recommended prior or concurrent study: 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 program and to focus the student's analytical skills towards synthesis of solutions by working through the design of several simple, commonly used devices.

OBJECTIVES

The course objectives define the student learning outcomes for a course. The assessment item(s) that may be used to assess student achievement of an objective are shown in parenthesis. On completion of this course, students should be able to:

1. identify appropriate analytical models to describe and predict the behaviour of standard machine components; (Assignment 1; Assignment 2; Examination)
2. reduce the behaviour of a complex machine into appropriate sub- systems/elements and then analyse the behaviour of their elements; (Assignment 1; Assignment 2, Examination)
3. apply stress analysis theory, fatigue theory and appropriate criteria of failure to the design of simple machine elements; (Assignment 1; Assignment 2; Examination)

4. analyse and evaluate forces and stresses within a spur gear system; (Assignment 2; Examination)
5. design simple power transmission systems; (Assignment 2; Examination)
6. select appropriate mechanical components from manufacturers' catalogues; (Assignment 2; Examination)
7. design springs, plain bearings and fluid seals; (Assignment 2; Examination)
8. apply codes and standards to machine component design; (Assignment 2; Examination)
9. communicate the results of a design assignment by means of drawings and a design report; (Assignment 2)
10. make appropriate use of available computer aided design software; (Assignment 2)

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	10.00
6.	Rivetted, Welded and Bonded Joints	10.00
7.	Springs	10.00
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	5.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at http://bookshop.usq.edu.au click 'Semester', then enter your 'Course Code' (no spaces).

Juvinall, RC & Marshek, KM 2005, *Fundamentals of Machine Component Design*, 4th edn, Wiley,

Standards Association of Australia 1999, *Design Standards for Mechanical Engineering Students (SAA HB6)*,

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, AD, Michels, WJ & Wilson, CE 1996, *Machine Design Theory and Practice*, MacMillan, New York.

Shigley, JE, Mischke, CR & Budynas, R 2004, *Mechanical Engineering Design*, 7th edn, McGraw Hill, New York.

Ugural, AC 2004, *Mechanical Design - An Integrated Approach*, McGraw Hill, Boston.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Assessment	26.00
Directed Study	52.00
Examinations	2.00
Private Study	75.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
ASSIGNMENT 1	200.00	20.00	05 Sep 2007
ASSIGNMENT 2	200.00	20.00	17 Oct 2007
2 HOUR OPEN EXAMINATION	600.00	60.00	END S2 (see note 1)

NOTES

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

IMPORTANT ASSESSMENT INFORMATION

1 Attendance requirements:
There are no attendance requirements for this course. However, it is the students' responsibility to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration.

2 Requirements for students to complete each assessment item satisfactorily:
To satisfactorily complete an individual assessment item a student must achieve at least 50% of the marks or a grade of at least C-. (Depending upon the requirements in Statement 4 below, students may not have to satisfactorily complete each assessment item to receive a passing grade in this course.)

3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 10% of the total marks available for the assignment will apply for each working day late.

4 Requirements for student to be awarded a passing grade in the course:

To be assured of receiving a passing grade a student must achieve at least 40% in each of the summative assessments and at least 50% of the available weighted marks for the summative assessment items.

5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.

6 Examination information:
In an Open Examination, candidates 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.

7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the examination period at the end of the semester of the next offering of this course.

8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL http://www.usq.edu.au/corporateservices/calendar/part5.htm or in the current USQ Handbook.

ASSESSMENT NOTES

1 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner.

2 Students must retain a copy of each item submitted for assessment. This must be despatched to USQ within 24 hours if required by the Examiner.

3 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.

4 The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media.

5 The Faculty will NOT accept submission of assignments by facsimile.

6 Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements.

7 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.

8 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 one of the temporary grades: IM (Incomplete - Make up), IS (Incomplete - Supplementary Examination) or ISM (Incomplete -Supplementary Examination and Make up). A temporary 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.

9 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); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).

10 This is a communication benchmark course and the assessment of this course will be associated with the demonstration of communication skills.