



The University of Southern Queensland

Course specification

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: Mechatronic Practice

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
ENG	3905	90355	2, 2009	EXT	0.00	Toowoomba

Academic group:	FOENS
Academic org:	FOES02
Student contribution band:	2
ASCED code:	030799

STAFFING

Examiner: John Billingsley
Moderator: Samuel Cubero

SYNOPSIS

In mechatronics, mechanical, electrical and computing elements are combined to form an integrated whole. This course draws together mechanical, electrical, software and interfacing aspects of a mechatronic system through a progressive sequence of experiments. A motor is connected to a computer through a power amplifier, while another motor in tandem is monitored through an analogue interface to determine its speed. A line or two of code makes speed control possible. A belt drives a 'trolley' of which the position is monitored and some more effort including some nonlinear strategies results in a 'crisp' position controller of an industrial standard. An inverted pendulum is added to the trolley and the student devises a control scheme to keep it balanced. Several other brief experiments give familiarity with pneumatic positioning and vision interfacing. This course will round off the formation of a mechatronics engineer.

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. devise or select sensors for measuring the motion of a dynamic system (Report);
2. describe and be familiar with the operation of an analogue interface (Report);
3. select sensors for system control and interface them (Report);
4. understand and write programs for the application of on-line digital control (Report);
5. analyse a dynamic system in terms of discrete time equations (Report);
6. devise and apply on-line control algorithms and test them (Report).

TOPICS

Description	Weighting (%)
1. Analogue to digital interfacing	20.00

2.	Computer controlled velocity	20.00
3.	Nonlinear computer position control	20.00
4.	Computer control of an inverted pendulum	20.00
5.	Familiarisation with pneumatic control and computer-vision control systems. (See web notes for further details for all topics listed.)	20.00

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).

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.

ENG4406 Robotics and Machine Vision web-mounted Study Package, USQ Publication, Toowoomba.

Billingsley, J 2006, *Essentials of Mechatronics*, John Wiley & Sons, Hoboken, NJ.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Directed Study	9.00
Laboratory or Practical Classes	24.00
Private Study	17.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
REPORT	1.00	100.00	16 Oct 2009 (see note 1)

NOTES

1. The brief report is to be uploaded as a Word file to a Study Desk assignment.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:

This course requires attendance at a residential school. It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories

- and practical work) scheduled for them, and 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. Students must attend and complete the requirements of the Workplace Health and Safety training program for this course before they are able to undertake any practical work in the electrical laboratories.
- 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:
Practical reports submitted after the due date will not be assessed.
 - 4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade students must complete at least 80% of the practical and other activities at a satisfactory standard at the Residential School for the course, as stated in 2 above.
 - 5 Method used to combine assessment results to attain final grade:
As P is the only passing grade available for this course, all students who are qualified for a passing grade, under the requirements in 4 above, will be given a grade of P. Other students will be given either a Failing grade or an Incomplete grade.
 - 6 Examination information:
There is no examination in this course.
 - 7 Examination period when Deferred/Supplementary examinations will be held:
Not applicable.
 - 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 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.
- 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).