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: Electronic Workshop and Production**

| Subject | Cat-nbr | Class | Term | Mode | Units | Campus |
|---|---|---|---|---|---|---|
| ELE | 2501 | 90542 | 2, 2009 | EXT | 1.00 | Toowoomba |

**Academic group:** FOENS
**Academic org:** FOES04
**Student contribution band:** 2
**ASCED code:** 031399

## STAFFING

Examiner: Glenn Harris
Moderator: Andrew Maxwell

## REQUISITES

Pre-requisite: ELE1801 and ELE1502

## SYNOPSIS

A technical officer or professional engineer, employed in the electrical and electronic industry, will at some time be involved in the design and development of electronic equipment. A knowledge of manufacturing processes and construction practice is therefore necessary; whether developing new processes, improving existing processes, using manual skills "hands on" or supervising others using these skills. The information presented in this course will provide the necessary background to manufacturing processes and the manual skills necessary to develop a final product. The aim of this course is to enable the student to comprehend the principles of modern manufacturing processes and to acquire competency in the design, construction and documentation of electronic equipment. The principles of component selection, printed circuit design using CAD software, fabrication and assembly techniques are presented and modern automated assembly using surface mount technology is introduced.

## 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. analyse electronic components and interpret their specifications with regard to reliability and selection (PCB Design and Timed CMA1);
2. design a printed circuit board to satisfy client and technical requirements, using computer-assisted techniques (PCB Design and Timed CMA1);
3. construct an item of electronic equipment to a specified standard (Electronic Project Assembly and Timed CMA2);

4. develop workshop manuals and other documentation for electronic equipment (Electronic Project Manual and Timed CMA2);
5. compare modern electronic manufacturing processes and techniques (Timed CMA1).

## TOPICS

| | Description | Weighting (%) |
|---|---|---|
| 1. | Component Familiarisation | 5.00 |
| 2. | Electrical and Electronic Drafting | 6.00 |
| 3. | PCB Design and Manufacture | 14.00 |
| 4. | Introduction to Surface Mount Technology | 9.00 |
| 5. | Workshop Safety and Practice | 6.00 |
| 6. | Hand Tools | 9.00 |
| 7. | Mechanical Design and Construction | 16.00 |
| 8. | Soldering | 18.00 |
| 9. | Introduction to Troubleshooting | 6.00 |
| 10. | Electronic Equipment Documentation | 11.00 |

## 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).

Approved Electronics Project (eg Instrumentation Amplifier Kit)

Students will require internet access to USQ Connect for this course.

PCB design software - Altium Designer (12 month student licence)

## 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.

Boothroyd, G, Dewhurst, P & Knight, W 2002, *Product Design for Manufacture and Assembly*, 2nd edn, Marcel Dekker Inc, New York.

(Library also has access to this electronically through Netlibrary)

Department of Employment, Education and Training 1988, *Basic Training Manual 16-1: Electrical and Electronic Safe Procedures*, K P McCormack, Aust Govt Publishing Service, Canberra.

Klein Wassink, RJ 1989, *Soldering in Electronics*, 2nd edn, Electrochemical Publications Limited, Port Erin, British Isles.

Leonida, G 1981, *Handbook of Printed Circuit Design - Manufacture, Components & Assembly*, Electrochemical Publications Limited, Scotland.

Standards Association of Australia 1996, *SAA HB3 Electrical & Electronic Drawing Practice for Students*, Standards Association of Australia,

(Available online via library catalogue - Standards On-Line Premium)

## STUDENT WORKLOAD REQUIREMENTS

| ACTIVITY | HOURS |
|---|---|
| Assessments | 82.00 |
| Directed Study | 73.00 |

## ASSESSMENT DETAILS

| Description | Marks out of | Wtg (%) | Due date |
|---|---|---|---|
| PCB DESIGN | 150.00 | 15.00 | 31 Aug 2009 |
| TIMED CMA 1 | 250.00 | 25.00 | 07 Sep 2009 (see note 1) |
| ELECTRONIC PROJECT ASSEMBLY | 250.00 | 25.00 | 19 Oct 2009 |
| ELECTRONIC PROJECT MANUAL | 100.00 | 10.00 | 19 Oct 2009 |
| TIMED CMA 2 | 250.00 | 25.00 | 26 Oct 2009 (see note 2) |

**NOTES**

1. The Timed CMA's comprise a series of 50 multiple choice questions each. The time allowed for each CMA is 60 minutes and may only be attempted once. The CMA's will be posted on Study Desk approximately two days before the due date and must be completed and submitted on or before the due date.
2. (see Note 1)

## 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 complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available (or at least a grade of C-) for each assessment item.

3 Penalties for late submission of required work:
If students submit assignments after the due date without extenuating circumstances then a penalty of 5% of the assigned mark may apply for each working day late up to a maximum of ten working days at which time a mark of zero can be recorded for that assignment.

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

To be assured of receiving a passing grade in a course a student must obtain at least 50% of the total weighted marks for the course.

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:
There is no examination for this course.

7 Examination period when Deferred/Supplementary examinations will be held:
As there are no examinations in this course, there will be no deferred or supplementary examinations.

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 assignments 1 and 3 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).

## OTHER REQUIREMENTS

1 Students will require access to e-mail and internet access to UConnect for this course.

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