



SCHOOL OF ELECTRICAL, COMPUTER AND TELECOMMUNICATIONS ENGINEERING

SUBJECT OUTLINE

GCT9333 DIGITAL HARDWARE 2

**6 CREDIT POINTS, ANNUAL 2009
WOLLONGONG CAMPUS**

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1. Subject Coordinator

Dr Montse Ros

Room: 35.G26

Tel: 4221 3133

Email: montse@uow.edu.au

Consultation Times:

Tuesdays 0930-1130 and Thursdays 0930-1130. Students are advised to use email to make appointments.

2. Teaching Staff

Mr Peter Vial

Room: 35.G24D

Tel: 4221 5499

Email: peter_vial@uow.edu.au

Consultation Times:

Tuesdays 1030–1230 and Fridays 0930–1130. Students are advised to use email to make appointments.

3. Subject General Information

Equivalence: ECTE333

4. Subject Description

In this subject the following topics will be covered: computer architecture; central processing unit; memory (ROM and RAM); input/output devices; basic computer organisation; binary data and instruction codes; machine and assembly languages - instruction set; direct and indirect addressing; building computer systems from commercially available parts such as micro-processors and micro-controllers; static and dynamic memory; A/D and D/A converters; digital I/O; and serial communication integrated circuits. Students will also be required to become proficient at interfacing a micro-controller with digital hardware and writing programs to control the hardware.

5. Subject Objectives

On successful completion of this subject students should be able to:

- (a) explain the architecture of digital computers;
- (b) design a simple microprocessor system from readily available integrated circuits;
- (c) write simple assembler language programs to interact with the outside world; and
- (d) demonstrate appropriate laboratory skills.

6. Graduate Attributes

Students will acquire the following statistical, information, computer and academic literacy as a result of explicit teaching/learning activities in this subject:

- (a) observe, describe, document, interpret, make decisions; critically consume and evaluate information. [Graduate Attribute 1/Generic Attribute (i)]
- (b) explore issues with existing knowledge, including written and oral analysis; understand principles, laws and formulae to use knowledge to solve academic problems; understand not only the theory of the discipline by also the practical implications and applications of the acquired knowledge. [Graduate Attribute 2/Generic Attributes (c) and (h)]
- (c) use all forms of expression to communicate knowledge to others – spoken, written, graphic and other non-verbal forms appropriate to context; formulate clear concise questions based on information needs; appreciate the need for maintaining records. [Graduate Attribute 3/Generic Attribute (b)]
- (d) interact effectively with other people on a one to one basis and in groups to achieve a shared goal; engages in and receives constructive criticism and argument. [Graduate Attribute 4/Generic Attribute (f)]

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Effective from: 1 March 2009

Subject Coordinator: Dr M. Ros

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- (e) critically evaluate information sources; identify, respond to and devise solutions to problems; understand basic design problems and utilise a variety of methods in their solution; use knowledge of basic science and engineering fundamentals to develop a command of existing knowledge within a chosen discipline. [Graduate Attribute 5/Generic Attributes (a), (d) and (e)]
- (f) is information literate, ie. has the ability to access, locate, critically analyse, interpret, evaluate and use information; is computer literate, ie. has the ability to use effectively a personal computer, associated peripherals and generic software to find, store, retrieve and manipulate data. [Graduate Attribute 7]
- (g) identify, respond to and devise solutions to problems; identify ethical dimensions of a problem or issue. [Graduate Attribute].

7. Attendance Requirements and Timetable

In accordance with the University Code of Practice – Students, students should attend all lectures, workshops, seminars and practicals associated with this subject.

This subject consists of:

Autumn Session: 2 hour Lecture, 1 hour Tutorial and 1 hour Laboratory per fortnight

Spring Session: 2 hour Lecture, 1 hour Tutorial & 2 hour Laboratory per fortnight

The timetable for this subject is available on [SOLS](#).

8. Major Texts and References

Students are recommended to read the following reference texts:

*D. Gadre, **Programming and Customizing the AVR Microcontroller**, McGraw Hill, 2001*

*V. P. Heuring, H. F. Jordan, **Computer Systems Design and Architecture**, 2nd ed, Pearson Prentice Hall, 2004.*

*W. Stallings, **Computer Organization and Architecture**, 7th ed, Pearson Prentice Hall, 2006*

*A. S. Tanenbaum, **Structured Computer Organization**, 4th ed, Prentice Hall, 2006.*

*B. W. Kernighan, D. M. Ritchie, **The C Programming Language**, 2nd ed, Prentice Hall, 1988.*

*S. F. Barrett, D. Pack, **Atmel AVR Microcontroller Primer: Programming and Interfacing**, Morgan & Claypool, 2007*

*R. H. Barnett, S. Cox, L. O’Cull, **Embedded C Programming And The Atmel AVR**, 2nd ed, Thompson Delmar, 2006*

*J. Pardue, **C Programming for Microcontrollers**, Smiley Micros, 2005*

*Atmel Corporation, **The AVR ATmega8515 User’s Manual**, Atmel Corporation, 2006*

*Atmel Corporation, **The 8-bit AVR Instruction Set**, Atmel Corporation, 2005*

Note: This is not an exhaustive list.

9. Required Materials

Students are required to purchase a Laboratory Logbook. This is a hardcover, bound book with no loose sheets.

Students will be advised of any further requirements.

10. Subject Website

The subject has an online support site which will be used for delivery of course material and online assessment. This can be accessed via [SOLS](#).

11. Assessment Task List

Below is a summary of all assessment tasks for this subject.

Students are encouraged to check their Student Planner which indicates which assessments are due on a week-by-week basis.

This planner is available from the subject's WebCT resource.

In addition to the information below, students are advised that School Policies relevant to the assessment of this subject are available on-line on the School webpage under information for [Current Students](#).

Students are advised to access this information immediately. Hard copies of this material are available from the School Office (35.G43) on request.

Autumn Session:

| Assessment Task | Weight | Method of Submission | Length, Style and Format Required | Date Due, Time and Location, if Relevant | Penalties for Late Submission |
|--|--------|--|---|---|--|
| Autumn End of Session Examination | 25% | Exam Paper | Short answer problems | Official University Examination | N/A |
| Practical Examination | 10% | Exam Paper and electronic program | 50mins to solve lab problem | Official University Examination | N/A |
| Class Test | 5% | Test Paper | 50mins Short answer | Lecture in Week 9 | N/A |
| Laboratories – Summary Lab Report | 5% | Printed hard copy | 2 pages per experiment maximum (12 pages) | 4.00pm Friday Week 13 in 900-level Box located outside 35.132A | 20% penalty for each day |
| Laboratories – <u>Preparation</u> and <u>Demonstration</u> | 5% | <u>Preparation:</u> Online Quiz <u>Demo:</u> Demonstration to tutor and hard copy in Lab Notebook | <u>Preparation:</u> 20 Multiple Choice Questions <u>Demo:</u> As written in Laboratory | <u>Preparation:</u> due online 10mins before the start of lab <u>Demo:</u> Marked during each Practical Laboratory Class | <u>Preparation:</u> Loss of 60% of demo marks <u>Demo:</u> Loss of all demo marks |

| <u>Spring Session:</u> | | | | | |
|--|---------------|--|---|---|--|
| Assessment Task | Weight | Method of Submission | Length, Style and Format Required | Date Due, Time and Location, if Relevant | Penalties for Late Submission |
| Spring End of Session Examination | 25% | Exam Paper | Short answer problems | Official University Examination | N/A |
| Practical Examination | 10% | Exam Paper and electronic program | 50mins to solve lab problem | Official University Examination | N/A |
| Class Test | 5% | Test Paper | 50mins Short answer | Lecture in Week 9 | N/A |
| Laboratories – Summary Lab Report | 5% | Printed hard copy | 2 pages per experiment maximum (12 pages) | 4.00pm Friday Week 13 in 900-level Box located outside 35.132A | 20% penalty for each day |
| Laboratories – <u>Preparation</u> and <u>Demonstration</u> | 5% | <u>Preparation:</u> Online Quiz <u>Demo:</u> Demonstration to tutor and hard copy in Lab Notebook | <u>Preparation:</u> 20 Multiple Choice Questions <u>Demo:</u> As written in Laboratory | <u>Preparation:</u> due online 10mins before the start of lab <u>Demo:</u> Marked during each Practical Laboratory Class | <u>Preparation:</u> Loss of 60% of demo marks <u>Demo:</u> Loss of all demo marks |

12. Assessment Task Details

Tutorials and Class Tests:

Each fortnight, students will be asked to do problems in the Tutorial. Students should attempt these before entering the tutorial class. Solutions will be discussed and presented at the tutorials, but will not be made available online until Week 13. Tutorials are not assessable; however students are encouraged to complete these as they are relevant to the Class Test and Final Exam. Tutorial solutions will only be released to students **after** the class test in Week 9.

There will be a class test in Week 9 of both sessions. Material covered in this test will include Lectures and Tutorials from Weeks 1-8. The class test will be 50mins in duration and will be conducted during the first hour of the Week 9 lecture time period.

Laboratories:

There are no laboratories in Week 1 of either session - laboratories start in Week 2 of session. There is a separate handout ("Lab Notes") containing the details of the experiments to be undertaken in laboratory classes. Students will be expected to spend 2 hours every fortnight preparing the experiments specified in the notes in addition to the 1 hour class allocated to demonstrate their experiments. All students are expected to complete all experiments. Students are expected to keep a record of their activities in the laboratory in a notebook, and the notebook will be marked during each laboratory session as part of the demonstration mark.

Before entering the laboratory, students are expected to complete an online 'pre-lab' quiz of multiple choice questions to a satisfactory level (80%). Quizzes may be attempted as many times as needed, to achieve the satisfactory level. Failure to complete the pre-lab quiz satisfactorily before the laboratory will result in a penalty of 60% of the corresponding lab demonstration mark. There will also be a test in the laboratory for all students during the end of session exam period.

Summary Lab Reports:

Two Laboratory reports are due, one in Autumn Session Week 13 (up to 12 pages) – covering experiments 1-6 – and one in Spring Session Week 13 (up to 12 pages) – covering experiments 7-12. For details of what is required in a Laboratory Report, students should view the online WebCT resource.

Laboratory reports should be placed in the collection box marked '900-LEVEL' located outside 35.132A. Late submissions will attract 20% penalty for each day. Reports submitted with 5 days or more delays will not be marked. Students are required to complete the appropriate cover sheet (available on the Web or from outside the School Office) for each report.

13. Extensions for Written Work/Academic Consideration

Students who miss a deadline or otherwise find their work in the subject affected by illness or serious misadventure are required to lodge a formal request for Academic Consideration via [SOLS](#). The procedures for lodging a request are available at:

<http://www.uow.edu.au/about/policy/studentacademicconsideration.html>

14. Return and Retention of Assessed Materials

Assessed materials (with the exception of end of session examination papers) will be returned to students in class or available from the SECTE Stores Officer in Room 35.132A. Uncollected materials will be retained until Week 13 of the following Session. Following this date uncollected materials will be securely disposed of.

End of session examination papers are not returned to students. Students wishing to view their end of session examination paper will need to contact the subject coordinator to arrange a time for viewing. End of session examination papers are held by the School in a secure location for a period of two years before they are disposed of securely.

15. Plagiarism

Students are responsible for submitting original work for assessment, without plagiarism or cheating, abiding by the University's policy on plagiarism as set out in the University Handbook under Universities Policy Directory and in Faculty Handbooks and subject guides. Plagiarism has led to expulsion from the University.

Plagiarism is the use of another person's work, or idea, as if it were your own. The other person may be an author, critic, lecturer or another student. When it is desirable, or necessary, to use other people's material, take care to include appropriate references and attribution - do not pretend the ideas are your own. Be sure not to plagiarise unintentionally. For example use of phrases, sentences or paragraphs, or use of software algorithms, subroutines, techniques or designs produced by others, without clearly describing their origin, is a common form of plagiarism, which can attract severe penalties and even expulsion from the University.

PLAGIARISM WILL NOT BE TOLERATED.

Non-detection of plagiarism in one case, cannot be used as a excuse for continuing the practice. Plagiarism has led to expulsion from the University. If you are in any doubt as to what plagiarism means, the article on 'Plagiarism and Intellectual Property' in the November 2001, Vol.39, No.11 issue of IEEE Communications Magazine, will answer most of your questions and you are strongly advised to read it. Oral examinations may be conducted to authenticate work.

Students must abide by they University's policy on [Acknowledgement Practice/Plagiarism](#).

16. Grievance Procedures

Students that have a problem or concern in relation to their academic experience will need to consult the University and Faculty of Informatics [Grievance Procedure](#).

17. School Policies

All School Policies applying to this subject, including academic consideration, grievance procedures and assessment are available from the School's webpage under information for [Current Students](#).

Students are advised to familiarise themselves with these requirements. Hard copies are available from the School Office (35.G43) on request.

School Policies do not supersede any University Codes of Practice, rules and Guidelines. School policies must be read in conjunction with the applicable University requirements.

18. University Codes of Practice, Rules and Guidelines

The University has in place codes of practice, rules and guidelines that define a range of policy issues on both educational and student matters. Students must familiarise themselves with the contents of these requirements:

- (a) Code of Practice - Teaching and Assessment
http://www.uow.edu.au/handbook/codesofprac/teaching_code.pdf
- (b) Code of Practice - Students
http://www.uow.edu.au/handbook/codesofprac/cop_students.html
- (c) Acknowledgement Practice/Plagiarism
<http://www.uow.edu.au/handbook/courserules/plagiarism.html>
- (d) General Course Rules (including: Enrolment, Assessment and Intellectual Property)
<http://www.uow.edu.au/handbook/generalcourserules/index.html>
- (e) Academic Consideration Policy
<http://www.uow.edu.au/about/policy/studentacademicconsideration.html>
- (f) Course Progress Policy
<http://www.uow.edu.au/student/mrp/index.html>
- (g) Respect for Diversity Policy
http://www.uow.edu.au/about/policy/Respect_for_Diversity_Policy.pdf
- (h) Occupational Health and Safety
<http://staff.uow.edu.au/ohs/commitment/ohspolicy/index.html>
- (i) Student Academic Grievance Policy
<http://www.uow.edu.au/handbook/courserules/studacgrievpol.html>
- (j) Disability Support
<http://www.uow.edu.au/student/services/ds/>

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