ELEC1601: INTRODUCTION TO COMPUTER SYSTEMS

Semester 2, 2016 | 6 Credit Points | Mode: Normal-Day
Coordinator(s): Abelardo Pardo

WARNING: This unit is an archived version! See Overview tab for delivered versions.

1. INTRODUCTION

This unit of study introduces the fundamental digital concepts upon which the design and operation of modern digital computers are based. A prime aim of the unit is to develop a professional view of, and a capacity for inquiry into, the field of computing.

Topics covered include: data representation, basic computer organisation, the CPU, elementary gates and logic, machine language, assembly language and high level programming constructs.

2. LEARNING OUTCOMES

Learning outcomes are the key abilities and knowledge that will be assessed in this unit. See assessment summary table below for details of which outcomes are assessed where. Outcomes are listed according to the course goals that they support.

Design (Level 1)

1. Ability to apply concept, principles and techniques to configure a basic system.
2. Ability to scope, build and test an engineering artefact.
3. Proficiency in applying computer engineering knowledge in the design, construction and testing of commensurate solutions for specific engineering problems.

Maths/Science Methods and Tools (Level 2)

4. Ability to demonstrate understanding of the concepts and principles of computer architecture, digital logic design and microprocessor assembly language.
5. Ability to demonstrate understanding of the concepts, principles and relationship for computers, the internet and clients and servers.
6. Ability to demonstrate fundamental knowledge of computer engineering issues.

Communication (Level 2)

7. Ability to write reports to present design specific information and results concisely and accurately.

Professional Conduct (Level 1)

8. An appreciation of the professional practice, standards and responsibilities in working with hardware and software to the limit afforded by lab sessions and exercises.

Project and Team Skills (Level 2)

9. Ability to engage in team-based design, drawing on the knowledge, skills and creative talent of all members to deliver a solution to a particular engineering problem.

For further details of course goals related to these learning outcomes, see online unit outline at http://cusp.eng.usyd.edu.au/students/view-unit-page/alpha/ELEC1601 .

3. ASSESSMENT TASKS

ASSESSMENT SUMMARY

Assessment name	Team-based?	Weight	Due	Outcomes Assessed
Preparation Activities for the Lecture	No	10%	Multiple Weeks	3, 4, 5, 6
Tutorial Presentation Questions	No	5%	Multiple Weeks	4
Tutorial active participation	No	5%	Multiple Weeks	4, 5
Midterm Exam	No	20%	Week 6	4, 5
Laboratory Report	No	5%	Multiple Weeks	1, 4, 6, 8
Project report	Yes	8%	Week 13	6, 7
Project Demonstration	Yes	4%	Week 13	5, 9
Project Presentation	Yes	3%	Week 13	5, 9
Final Exam	No	40%	Exam Period	4, 5, 6

ASSESSMENT DESCRIPTION

Lecture preparation: Sequence of exercises to be answered online.

Tutorial: Sequence of exercises to be answered online + active participation in the session.

Laboratory report: Solve a problem requiring the use of hardware and embedded systems and then write a professional report describing the session (1 report during Weeks 2 - 6)

Midterm exam: Multiple choice question exam

Project report: Report describing how the project was implemented.

Project demonstration: Demonstrate the result of the project to the rest of the class.

Project presentation: Oral presentation on how the project was executed.

Final Exam: End of semester exam

ASSESSMENT FEEDBACK

Assessment feedback will be provided face to face in the labs and tutorials, via BlackBoard for assignments submitted online, and through a dashboard embedded in the course notes.

ASSESSMENT GRADING

Final grades in this unit are awarded at levels of HD for High Distinction, DI (previously D) for Distinction, CR for Credit, PS (previously P) for Pass and FA (previously F) for Fail as defined by University of Sydney Assessment Policy. Details of the Assessment Policy are available on the Policies website at http://sydney.edu.au/policies . Standards for grades in individual assessment tasks and the summative method for obtaining a final mark in the unit will be set out in a marking guide supplied by the unit coordinator.

4. ATTRIBUTES DEVELOPED

Attributes listed here represent the course goals designated for this unit. The list below describes how these attributes are developed through practice in the unit. See Learning Outcomes and Assessment sections above for details of how these attributes are assessed.

Attribute	Method
Design (Level 1)	Design software in a team project environment
Maths/Science Methods and Tools (Level 2)	Detailed study of computer system fundamentals
Communication (Level 2)	Writing of assignments and reports. Oral presentation of project outcomes.
Professional Conduct (Level 1)	Team based laboratories with individual and group assessment components including oral examinations.
Project and Team Skills (Level 2)	The team project assignment introduces students to teamwork and project management in an engineering context

For further details of course goals and professional attribute standards, see the online version of this outline at http://cusp.eng.usyd.edu.au/students/view-unit-page/alpha/ELEC1601 .

5. STUDY COMMITMENT

Lecture: Requires previous preparation activites and active participation

Tutorial: Solve exercises extending the activities in the lecture. Requires preparation activities and active participation.

Laboratory: Hands on lab work on computer systems and design build and test a team project with a robot.

Independent Study: Preparation for lectures, tutorial and labs.

Activity	Hours per Week	Sessions per Week	Weeks per Semester
Lecture	2.00	2	13
Laboratory	3.00	1	12
Tutorial	2.00	1	12
Independent Study	3.00		

Standard unit of study workload at this university should be from 1.5 to 2 hours per credit point which means 9-12 hours for a normal 6 credit point unit of study. For units that are based on research or practical experience, hours may vary. For lecture and tutorial timetable, see University timetable site at: web.timetable.usyd.edu.au/calendar.jsp

6. TEACHING STAFF AND CONTACT DETAILS

COORDINATOR(S)

Name	Room	Phone	Email	Contact note
Pardo, Abelardo			abelardo.pardo@sydney.edu.au	

LECTURERS

Name	Room	Phone	Email	Contact note
Pardo, Abelardo			abelardo.pardo@sydney.edu.au	

7. RESOURCES

COURSE WEBSITE(S)

Notes and discussions will be provided on BlackBoard and through bit.ly/elec1601 (only for students enrolled in an Australian University)

NOTE ON RESOURCES

ELEC1601 Course Notes available electronically at bit.ly/elec1601

8. ENROLMENT REQUIREMENTS

ASSUMED KNOWLEDGE

HSC Mathematics extension 1 or 2

PREREQUISITES

None.

9. POLICIES

See the policies page of the faculty website at http://sydney.edu.au/engineering/student-policies/ for information regarding university policies and local provisions and procedures within the Faculty of Engineering and Information Technologies.

10. WEEKLY SCHEDULE

Note that the "Weeks" referred to in this Schedule are those of the official university semester calendar
https://web.timetable.usyd.edu.au/calendar.jsp

Week	Topics/Activities
Week 1	Course organization and computer system overview
Week 2	Encoding information in binary
Week 3	Computer memory
Week 4	Boolean algebra and combinational logic
Week 5	Sequential circuit design
Week 6	In-class midterm examination
	Assessment Due: Midterm Exam
Week 7	AVR Architecture
Week 8	Instruction Set Architecture (AVR)
Week 9	Assembly programs
Week 10	Addressing Modes
Week 11	High Level Programming Constructs
Week 12	Subroutines
Week 13	Exam Simulation
	Assessment Due: Project report
	Assessment Due: Project Demonstration
	Assessment Due: Project Presentation
Exam Period	Final exam
	Assessment Due: Final Exam