Unit Plan

Unit codes: **ENS1161**
ENS4103
Unit titles: **Computer Fundamentals**
Computer Systems & Hardware

Unit Outline

EDITH COWAN UNIVERSITY
FACULTY OF COMPUTING, HEALTH AND SCIENCE
SCHOOL OF ENGINEERING

UNIT TITLES:	Computer Fundamentals Computer Systems & Hardware
UNIT CODES:	ENS1161 ENS4103
CREDIT POINTS:	15
FULL YEAR UNIT:	No
PRE-REQUISITES:	None
MODE OF DELIVERY:	On-campus/Off-campus

DESCRIPTION

This unit presents fundamental topics in discrete mathematics that are essential to computing studies including logic, Boolean algebra and logic circuits, set theory, counting techniques, computer arithmetic, graph theory and matrix algebra with applications to computing. It also provides an introduction to the representation of numbers in a computer.

LEARNING OUTCOMES

On completion of this unit students should be able to:

1. use the laws of propositional logic to simplify or analyse compound propositions; use truth tables to establish logical equivalence and validity of arguments;
2. use set operations and Venn diagrams; apply elementary counting techniques;
3. use Boolean algebra and Karnaugh maps to simplify Boolean expressions; design, analyse and/or simplify logic circuits;
4. represent relations using graphs, ordered pairs and directed graphs; identify equivalence relations; use modular arithmetic; use function notation; identify onto and one-to-one functions; use composition of functions; find the inverse of a function;
5. convert integers and fractions between decimal, octal, binary and hexadecimal number systems; perform simple arithmetic in these systems;
6. use 2's complement representation of integers; interpret addition operations using CNV flags; perform BCD addition; use ASCII codes;
7. identify isomorphic graphs and planar graphs; use matrix representation of graphs; identify Eulerian and Hamiltonian graphs;
   find sums and products of matrices; apply the algebra of matrices to simple exercises in computer graphics and cryptography.

UNIT CONTENT

1. Propositions, connectives and truth tables; logical equivalence; laws of logic; arguments; predicate logic.
2. Sets and set operations; Venn diagrams; laws of sets; Cartesian product, counting techniques.
3. Boolean algebra; logic gates; Karnaugh maps; simplification of Boolean expressions; design and simplification of logic circuits; universality of NANDs.
4. Relations and their representations; equivalence relations and classes; modular arithmetic; application to cryptography. Function as process, function as relation; onto and one-to-one functions; composition and inverse functions.
5. Decimal, octal, binary and hexadecimal number systems and conversions of integers and fractions; arithmetic in these systems.
6. Computer representation of integers; addition and interpretation using CNV flags; addition of BCD numbers; ASCII code.
7. Null and complete graphs, complements; isomorphic graphs; matrix representation of graphs; planar graphs; Eulerian and Hamiltonian graphs. Addition and multiplication of matrices; transpose; zero and identity matrices; laws of matrix algebra; inverse of a square matrix; finding determinant and inverse of 2´2 matrix; application of matrices to computer graphics and cryptography.

TEACHING AND LEARNING PROCESSES

Lectures and tutorial/workshop sessions.

GRADUATE ATTRIBUTES

The following graduate attributes will be developed in this unit

- Ability to communicate
- Critical appraisal skills
- Ability to generate ideas

ASSESSMENT

Grading Schema 1

Item	*On/Off-Campus Assessment*	*Value*
Assignment	Assignment 1	15%
Assignment	Assignment 2	15%
Examination	End of semester examination	70%

To be eligible to pass the unit, students must pass the end of semester examination.

TEXTS

Nil.

SIGNIFICANT REFERENCES

Scheinerman, E. R. (2000). *Mathematics. A Discrete Introduction.* Brooks/Cole.

Grossman, P. (2009). *Discrete Mathematics for Computing.* (3rd ed.) Palgrave Macmillan.

Haggarty, R. (2002). *Discrete Mathematics for Computing.* Pearson Education Limited.

Kolman, B. Busby, R. C. Ross, S. C. (2009). *Discrete Mathematical Structures.* (6th ed.) Pearson Education.

INTRODUCTION

Welcome to the unit ENS1161/ENS4103 Computer Fundamentals/Computer Systems & Hardware. This unit will enable you to acquire knowledge about Boolean algebra and logic circuits, set theory, counting techniques, computer arithmetic, graph theory and matrix algebra with applications to computing.

TEACHING AND LEARNING APPROACH

The unit consists of a two-hour lecture and two-hour tutorial per week. Your active participation in all unit activities is strongly encouraged. Remember that you can ask questions at any point of time during the class and also outside the formal contact hours. The policy of open doors is in force.

UNIT COORDINATOR, LECTURER/TUTOR INFORMATION

Dr Wlodzimierz Gornisiewicz
Email: w.gornisiewicz@ecu.edu.au
Telephone: 6304 5172
Office: 5.215
Consultation: any time the office door is open

STUDY SCHEDULE

Week beginning	Module	Topic
28 Jul	1	Symbolic Logic
04 Aug	2	Predicates & Sets
11 Aug	3	Boolean Algebra & Logic Circuits
18 Aug	4	Karnaugh maps & Circuits
25 Aug	5	Relations
01 Sep	6	Functions **A1 due 05/09/2014 – 19:00**
08 Sep	7	Bases and Number Systems
15 Sep	8	Representation of Numbers in a Computer
22 Sep	9	Counting Techniques & Modular Arithmetic
29 Sep		MID SEMESTER BREAK
06 Oct	10	Graph theory **A2 due 10/10/2014 – 19:00**
13 Oct	11	Matrices & Applications 1
20 Oct	12	Matrices & Applications 2
27 Oct	13	Material Review

TIMETABLE

4 contact hours per week consisting of:

Lecture: 2 hours, **Tuesday, 14:30-16:30, ML 17.203**

Although you are not obliged to attend, **you are strongly advised to do so**. Many students have difficulty in reading mathematics notes. They find that face-to-face explanations are usually much easier to understand. Also you will get a better idea of which topics are more important for assessment. A roll will be taken in each class.

Tutorial: 2 hours, **Tuesday, 16:30-18:30, ML 17.203**

Once again, attendance is **strongly advised**. Students can also seek assistance outside of class times from: Dr Wlodzimierz Gornisiewicz at JO

ASSIGNMENTS

The two assignments are already posted on Blackboard, together with details of submission dates.

ASSIGNMENTS SUBMISSIONS

All assignments can be submitted through email (electronic copy) or placed in the lecturer's assignment box.

FINAL EXAMINATION

The 3-hour final examination will be "Restricted open book". For both ENS1161 and ENS4103 this means that you may take into the examination one A4 sheet (2 sides) of handwritten notes, formulae and so on.
You may use any type of calculator, including graphics and programmable calculators.
Check the front page of the Sample Exam paper on Blackboard for details.

MARK SCALING

Generally does not happen in this unit, although it may occur in line with the University assessment policy which can be found at http://www.ecu.edu.au/CLT/file_download/22/assessment_ECU.pdf.

- the recommended distribution of grades is:
    - Undergraduate courses: Approximately 35% distinction passes (High Distinction and Distinction) of which not more than half should be at the upper level.

Additionally

- No one who has achieved 50% or above, will be scaled down below 50%.
- However, results below 50% may be scaled to more than 50%.

ACADEMIC MISCONDUCT

See: http://www.ecu.edu.au/GPPS/governance_services/uni_rules.html
Edith Cowan University regards academic misconduct of any form as unacceptable. Academic misconduct includes, but is not limited to:

- plagiarism;
- unauthorised collaboration;
- cheating in examinations;
- theft of other students' work.

"academic misconduct" means conduct in relation to any academic work that is dishonest or unfair.
"cheating" means conduct in any assessment that is dishonest.
"plagiarism" means to knowingly or unknowingly present as one's own work the ideas or writings of another without appropriate acknowledgment or referencing. This includes, but is not limited to:

- paraphrasing text without acknowledgment of the source;
- paraphrasing text inadequately with acknowledgment of the source;
- copying the text of another student's assignment or other students' assignments; and
- copying of visual representations (cartoons, line drawings, photos, paintings and computer programs).

PLAGIARISM

Any detected case of plagiarism or any other academic misconduct will be treated very seriously.

In accordance with the University Rules these cases will be reported to the Head of School.

INDUCTION FOR LECTURES

Emergency evacuations

- See Emergency Procedures multi-coloured flip chart and "Instruction to Lecturers" located in each room.
- Assist wheel chair bound/disabled/injured persons to a safe location inside the room while able bodies persons evacuate, and then assist them in evacuation.
- Obey instructions.
- Do not leave the premises or go to café etc. but go to Emergency Assembly Area (refer to chart).
- Do not use lifts.
- Wait to be told to return to building or to disperse by a FESA Officer in Charge or a Security Officer/Building/Area Warden

Emergency assistance

- Note the location and use of the Security phones on campus. These are radiophones and there will be a pause before an officer responds.
- Security Officers will escort them to vehicles.
- Security Officers are trained in First Aid.
- It is safer to walk around on campus and to transport after hours in pairs or more.
- There are designated well-lit walkways for movement around campus after dark.
- Note the location and availability of the campus Medical Suite.

Responsibilities of students

- If lecturer does not show inform school secretary/clerical as soon as possible.
- ECU supports a NON-SMOKING environment.
- Hazards need to be reported to a university staff member.
- Accidents and injuries need to be reported to a university staff member as soon as possible.

Please, sign the form provided.

OCCUPATIONAL SAFETY AND HEALTH

There are three documents on the Blackboard site related to OSH (in the “Unit Overview” section)

- Induction policy
- Induction for lectures
- Workstation ergonomics

You are encouraged to print out copies and retain for your records.

Please, read these documents.

ENGLISH LANGUAGE PROFICIENCY (ELP)

ECU is implementing a raft of procedures and supports to assist all students to develop and demonstrate appropriate standards of English language proficiency. As part of the process, ECU is seeking to ensure that each student receives feedback on ELP on all written assessments showing performance against ECU ELP standards.

The ECU ELP Measure shows your written ELP against the ECU standards. The ECU minimum standard for written ELP which all students should demonstrate by graduation is *moderate proficiency* (at least) in both the areas of Sentence Structure and Word Use. Undergraduate students in their second year are expected to be able demonstrate moderate proficiency in at least one of these areas.

The feedback you will receive will indicate your demonstrated level of written ELP in any assessment. You will also receive information describing the various supports and resources you can access should you need to further develop your ELP.

Written Proficiency	Low	Developing	Moderate	High
Sentence Structure			X	
Word Use			X	

ECU minimum standard for English Language Proficiency of graduates.