Faculty of Science, Engineering and Built Environment

SIT123 Data Capture Technologies

Deakin University Unit Guide

Trimester 2, 2018

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WELCOME

Welcome to unit **SIT123 Data Capture Technologies.** This unit will introduce you the fundamentals of data acquisition and their application to problems dependent on sensing the environment and the entities within it. You will investigate concepts related to measuring the external environment through sensors, and the various challenges to overcome. Using introduced techniques, you will analyse the captured data, and also look at ways to visualise insights gained.

This unit has weekly lab tasks, and you will be required to engage in these practical activities to achieve the learning outcomes.

The rise in popularity of smart devices and data analytics paves way for innovative applications. As an emerging area, there are also interesting challenges.

We hope this introductory unit will equip you with information and insight required to get you started in this new exciting area.

This Unit Guide provides you with the key information about this Unit. For the best chance of success, you should read it very carefully and refer to it frequently throughout the trimester. Your Unit site (accessed in **DeakinSync**) also provides information about your **rights and responsibilities.** We will assume you have read this before the Unit commences, and we expect you to refer to it throughout the trimester.

WHO IS THE UNIT TEAM?

Unit chair: leads the teaching team and is responsible for overall delivery of this unit

Feifei Chen

Unit chair details

Campus:	Melbourne Burwood Campus
	221 Burwood Highway
	BURWOOD VIC 3125
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Phone:	+61 3 924 46717

Other members of the team and how to contact them

Details of tutors will be announced closer to trimester start.

Administrative queries

- Contact your Unit Chair or Campus Leader
- Drop in or contact Student Central to speak with a Student Adviser

For additional support information, please see the Rights and Responsibilities section under 'Resources' in your unit site

ABOUT THIS UNIT

This unit will introduce students to ubiquitous and readily accessible devices for data capture, such as the sensor suite on a mobile smartphone, and those commonly used in homes, vehicles and current examples of cyber-physical systems. Students will be introduced to data capture protocols and methodologies, as well as data presentation and visualisation methods. Through practical investigations and analysis, students will investigate issues of robustness, reliability and validity of data and the effects of these on conclusions drawn from data.

Unit development in response to student feedback

Every trimester, we ask students to tell us, through eVALUate, what helped and hindered their learning in each Unit. You are strongly encouraged to provide constructive feedback for this Unit when eVALUate opens (you will be emailed a link).

Student evaluation surveys are conducted at Deakin to assess students' satisfaction with their teaching and learning experiences and to assist in determining whether any improvements are required.

This unit was first offered in 2017 and no negative feedback was received from students. I encourage you to complete the survey to help assess curriculum, teaching and assessment directions in this unit.

If you have any concerns about the Unit during the trimester, please contact the unit teaching team - preferably early in the trimester - so we can discuss your concerns, and make adjustments, if appropriate.

Your course and Deakin's Graduate Learning Outcomes

GLO1	Discipline knowledge and capabilities:	appropriate to the level of study related to a discipline or profession
GLO2	Communication:	using oral, written and interpersonal communication to inform, motivate and effect change
GLO3	Digital literacy:	using technologies to find, use and disseminate information
GLO4	Critical thinking:	evaluating information using critical and analytical thinking and judgment
GLO5	Problem solving:	creating solutions to authentic (real world and ill-defined) problems
GLO6	Self-management:	working and learning independently, and taking responsibility for personal actions
GLO7	Teamwork:	working and learning with others from different disciplines and backgrounds
GLO8	Global citizenship:	engaging ethically and productively in the professional context and with diverse communities and cultures in a global context

Each Deakin course has **course learning outcomes** which explain what the Deakin Learning Outcomes mean in your discipline. Learning in each unit builds towards the course learning outcomes.

Your Unit Learning Outcomes

Each Unit in your course is a building block towards these Graduate Learning Outcomes - not all Units develop and assess every Graduate Learning Outcome (GLO).

	These are the Learning Outcomes (ULO) for this Unit **At the completion of this Unit, successful** students can:	Deakin Graduate Learning Outcomes
ULO1	Acquire, process, visualise and interpret data using existing devices and technologies.	GLO1, GLO2
ULO2	Apply professional and ethical standards to data collection practices	GLO8
ULO3	Design data capture protocols and methodologies to meet user and functional requirements	GLO4, GLO5

ASSESSING YOUR ACHIEVEMENT OF THE UNIT LEARNING OUTCOMES

Overview

In brief, these are the assessment tasks for this Unit (details below):

Project and poster presentation 30%, practical tasks 30%, examination 40%

Summative assessments

(tasks that will be graded or marked)
NOTE: It is <u>your responsibility</u> to keep a backup copy of every assignment where it is possible (eg written/digital reports, essays, videos, images). In the unusual event that one of your assignments is misplaced, you will need to submit the backup copy. Any work you submit may be checked by electronic or other means for the purposes of detecting collusion and/or plagiarism.

When you are required to submit an assignment through your unit site (accessed in DeakinSync), you should receive an email to your Deakin email address confirming that it has been submitted. You should check that you can see your assignment in the Submissions view of the Assignment folder after upload, and check for, and keep, the email receipt for the submission.

- Summative assessment task 1

	Project and poster presentation
Brief description of assessment task	Students will apply data capture theory and practice to a specified problem requiring the application of the steps of acquisition, processing, visualisation and interpretation. Professional and ethical standards will be applied at each of the steps. Details of the work undertaken will be represented and presented in the form of a poster.
Detail of student output	Students submit the poster documenting their project development and resulting outcomes.
Grading and weighting (% total mark for unit)	30% Marked
This task assesses your achievement of these Unit Learning Outcome(s)	ULO1: Acquire, process, visualise and interpret data using existing devices and technologies. ULO2: Apply professional and ethical standards to data collection practices ULO3: Design data capture protocols and methodologies to meet user and functional requirements.

This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1: Assessed via student ability to demonstrate application of data capture techniques and concepts GLO2: assessed through student ability to succinctly communicate their thoughts in a professional manner. GLO4: assessed through student ability to analyse a specific problem and identify the requirements GLO5: assessed through student ability to design a solution to a specific problem GLO8: assessed through student ability to apply ethical standards to collect and store data
How and when you will receive feedback on your work	Students may seek early feedback (prior to submission) on project ideas and poster drafts during practical sessions. In addition, marking criteria will be explained during class time in week 8. Students will be provided feedback on their submission after it has been marked.
When and how to submit your work	Project code and posters will be submitted via unit site by Monday 9:00am in week 11. Students on campus will present during the practical session in week 11. Cloud students will present online.

- Summative assessment task 2

	Laboratory/practical tasks
Brief description of assessment task	Students will demonstrate individual stages of acquisition, processing, visualisation and interpretation as well as the design of data capture protocols and methodologies to meet user and functional requirements through experiments, research, practical development and scientific enquiry.
Detail of student output	Students will produce lab report forms evidencing their findings from practical investigations.
Grading and weighting (% total mark for unit)	30% Marked
This task assesses your achievement of these Unit Learning Outcome(s)	ULO1: Acquire, process, visualise and interpret data using existing devices and technologies. ULO3: Design data capture protocols and methodologies to meet user and functional requirements
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1: Assessed via student ability to demonstrate application of data capture techniques and concepts GLO4: assessed through student ability to analyse a given lab task and identify the sensing and analysing methods to be used. GLO5: assessed through student ability to design a solution to a specific problem
How and when you will receive feedback on your work	Students are encouraged to interact with the teaching staff during practical sessions. The students will be provided feedback on their assessment after it has been marked.
When and how to submit your work	Lab report forms to be submitted via the unit site by Monday 9:00am AEST in weeks 4, 6, 8, and 10.

- Summative assessment task 3

	Examination

Brief description of assessment task	Students will need to provide responses to a finite number of questions covering process knowledge, calculation, factual recall, and response appropriate to a specified scenario and context. Questions cover the stages of data acquisition, processing, visualisation and interpretation, the application of professional and ethical standards to data collection, and the design of data capture protocols and methodologies to meet user and functional requirements.
Detail of student output	Students must prepare written responses as appropriate that demonstrate the ability to adapt and apply techniques, and identify and resolve problems, related to unit content. Responses must communicate solutions effectively and professionally.
Grading and weighting (% total mark for unit)	40%
This task assesses your achievement of these Unit Learning Outcome(s)	ULO1: Acquire, process, visualise and interpret data using existing devices and technologies. ULO2: Apply professional and ethical standards to data collection practices. ULO3: Design data capture protocols and methodologies to meet user and functional requirements
This task assesses your achievement of these Graduate Learning Outcome(s)	GLO1: Assessed via student ability to demonstrate application of data capture techniques and concepts GLO4: assessed through student ability to analyse a specific problem and identify the requirements GLO5: assessed through student ability to design a solution to a specific problem GLO8: assessed through student ability to demonstrate knowledge of ethical standards to collect, store & visualise captured data
How and when you will receive feedback on your work	Feedback is provided to students through learning activities and other assessment task leading up to the final examination. Students are required to engage with this feedback in preparation for the examination. Students can also make an appointment to get feedback on their exam
When and how to submit your work	Students will be required to attend a supervised examination during the end of trimester examination period. It is the responsibility of students to review their examination timetable when it is released via DeakinSync.

Your learning experiences in this Unit - and your expected commitment

To be successful in this unit, you must:

- Read all materials in preparation for your classes or seminars, and follow up each with further study and research on the topic;
- Start your assessment tasks well ahead of the due date;
- Read or listen to all feedback carefully, and use it in your future work;
- Attend and engage in all timetabled learning experiences as follows:

Contact Hours

Campus: 1 x 2 hour class per week, 1 x 2 hour practical per week.
Cloud (online): 1 x 1 hour scheduled online workshop per week.

Students will on average spend 120 hours undertaking the teaching, learning and assessment activities for this unit. On average, this will include 4 face-to-face contact hours per week (1 x 2-hour class and 1x 2-hour practical class). Cloud (online) students should divide their time between online learning activities, discussion boards, assessment tasks, readings and study

time.

Students learn relevant approaches and investigate the stages of acquisition, processing, visualisation and interpretation by working through problem scenarios in classes and practicals. To this end they get the opportunity to work with several industry standard applications and environments.

Note

At Deakin,

- *Lectures* are referred to as *classes* (definition: a general meeting for all students, for which students do not need to register and where students are engaged through presentations and learning activities)
- *Tutorials, workshops and seminars* are referred to as seminars (definition: more interactive meetings for smaller groups of students).
- For the complete list of agreed definitions for learning experiences, see the Course Design and Delivery Procedure.

UNIT LEARNING RESOURCES

Your unit learning resources are available in your unit site accessed in DeakinSync.

Essential learning resources

There is no prescribed book for this unit. Resources such as those recommended will be used to support teaching and learning.
To complete the learning activities within this unit each student will require access to a specified set of computing devices and sensors. Details of these devices and how they can be ordered from local suppliers will be available through CloudDeakin site. The expected cost of this equipment is approximately $150. This equipment may be useful in other units within the Computer Science and Software Engineering courses. If students are experiencing economic hardship or difficulty in acquiring these devices they should contact the Unit Chair immediately.

Recommended learning resources

1. Programming Arduino: Getting Started with Sketches, Second Edition, Simon Monk.
2. Karvinen, T, & Karvinen, K 2013, Getting started with sensors. [electronic resource], Sebastopol, CA : Maker Media, (2014).
3. Arduino essentials : enter the world of Arduino and its peripherals and start creating interesting projects, Francis Perea.
4. Design for Information, Isabel Meirelles, Rockport (2013)

KEY DATES FOR THIS TRIMESTER

Trimester begins (classes begin)	Monday 9 July 2018
Intra-trimester break (a short break during trimester)	Monday 13 August - Sunday 19 August 2018
Trimester ends (classes cease)	Friday 28 September 2018
Study period (examination preparation period)	Monday 1 October - Friday 5 October 2018
Examinations begin	Monday 8 October 2018

Examinations end	Friday 19 October 2018
Inter-trimester break (the period between trimesters)	Monday 22 October - Friday 2 November 2018
Unit results released	Friday 2 November 2018 (6pm)

UNIT WEEKLY ACTIVITIES

Week	Commencing	Topic	Assessment activity
1	9 July 2018	Introduction	
2	16 July	Sensors	
3	23 July	Analysing sensor data	
4	30 July	Ethics	Lab reports due this week
5	6 August	Sensor output	
6	20 August	Data visualization	Lab reports due this week
7	27 August	Real world applications	
8	3 September	Mobile sensor data	Lab reports due this week
9	10 September	Sampling error	
10	17 September	Revision	Lab reports due this week
11*	24 September	Revision	Project source code and poster online submission due this week Project and Poster Presentation

Intra-trimester break: **Monday 13 August - Sunday 19 August 2018** (between weeks 5 and 6)

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***Friday 28 September:** AFL Grand Final Eve public holiday - University closed*