

STAT3100: Systems Thinking for an Integrated Workforce

Callaghan

Semester 2 - 2023



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description

Through a quality improvement and data analytics lens, the course develops the student's ability to leverage workplace data and synergies, analyse and improve organisational systems, and realise quality processes and outcomes.

Students will become systems thinkers, able to: engage appropriate statistical techniques for assessing, describing and improving systems, processes and outcomes; and, lead data-based decision making and quality improvement considerate of the system's many stakeholders, utilising the science, psychology, and management of systems and the underlying statistical principles.

The course provides a holistic industry-oriented approach which develops the student's analytical, management and leadership prowess and advances their T-shaped skillset.

Without data you're just another person with an opinion.

Assumed Knowledge

10 unit 1000 level Statistics course and at least 40 units at 2000 level from any degree program.

Contact Hours

Callaghan

Computer Lab

Face to Face On Campus

2 hour(s) per Week for Full Term

Lecture

Face to Face On Campus

2 hour(s) per Week for Full Term

Unit Weighting Workload

10

Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

COURSE OUTLINE

www.newcastle.edu.au

CRICOS Provider 00109J

CONTACTS

Course Coordinator	Callaghan Dr Kirill Glavatskiy Kirill.Glavatskiy@newcastle.edu.au Consultation: advised on the Canvas site
Teaching Staff	Other teaching staff will be advised on the course Canvas site.
School Office	School of Information and Physical Sciences SR233, Social Sciences Building Callaghan CESE-SIPS-Admin@newcastle.edu.au +61 2 4921 5513 9am-5pm (Mon-Fri)

SYLLABUS

Course Content	<ul style="list-style-type: none">• Total Quality Management (TQM) and systems thinking• how statistician W.E. Deming founded and implemented TQM, engaging systems thinking principles, for competitive advantage within Japan and internationally• the Deming Quality philosophy and that of other Quality theorists• techniques and tools for assessing, measuring and improving systems, processes and outcomes• understanding, learning from and reducing variability of processes through statistical thinking• the role of management and leadership in a TQM organisation• the role and implementation of quality improvement teams• the "seven simple tools" for process improvement• fundamental statistical methods and data collection, visualisation and interpretation• more advanced statistical techniques such as control charts, statistical process control, surveys and experimental design• complementary quality techniques such as benchmarking and quality standards (ISO9000)
Course Learning Outcomes	<p>On successful completion of this course, students will be able to:</p> <ol style="list-style-type: none">1. Describe and defend the fundamental principles of Total Quality Management and systems thinking2. Understand and utilise fundamental principles and methods underpinning holistic and integrated analytic thinking and process improvement within systems of both learning and organisational practice3. Choose appropriate statistical techniques and methods for improving systems, processes and the quality and value of their outcomes4. Write reports describing processes and recommending ways to improve them5. Keep abreast of changes in, and practical applications of, the field of systems, process and quality improvement.6. Appreciate and apply the value arising from the process of learning and discovery
Course Materials	<p>Lecture Materials: Provided on the course Canvas site. Please visit the course Canvas site regularly each week and ensure you check for emails sent to you from this site.</p> <p>Workshops: Weekly exercises will be provided and discussed.</p> <p>Course Notes: Six modules complementing the course's lecture content (approx. 220 pages) to be used to support your understanding of lecture and workshop materials.</p>

Lecture Materials: Weekly Microsoft Powerpoint Lecture Slides provided and discussed.

Other Resources: The statistical software package JMP. Prior knowledge or use of the software is not expected. JMP is available on-campus and is free to download for personal use from <https://www.newcastle.edu.au/current-students/support/it/software-and-tools#statistical>.

Recommended Reading:

Rao, A., Carr L.P., Dambolena I., et al. (1996) Total Quality Management: A Cross Functional Perspective. J. Wiley and Sons.

Familiarity with statistical concepts may assist your learning. Whilst such concepts will be addressed during the course, many may benefit from reading introductory statistical textbooks. The course will reference sections of the textbook 'Business Statistics in Australia: Methods and Applications' by Howley and Gerlach (e-copy is available via <https://payhip.com/b/pF1D>); however, students are advised to consider various sources to establish those which best supports their learning.

This textbook discusses much of the foundational material in the course.

The aforementioned Course Notes reference sections of this text as further support for understanding the lecture content and course modules, where students feel the needs for such additional perspectives; however, students are advised to consider various sources to establish those which best supports their learning.

The TQM field has contributors from a wide variety of backgrounds. Similarly, students taking this course come from a variety of backgrounds and will have differing requirements with respect to the material they wish to focus upon. You are encouraged to read from the relevant literature, focussing on aspects pertinent to your field of study, workplace or interest.

ASSESSMENTS

This course has 4 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Assignment 1	23:55 Sunday of Week 5	Individual	20%	1, 2, 3, 4
2	QUIZ	Conducted in the Week 10 Workshop	Individual	20%	1, 2, 3
3	Assignment 2	23:55 Sunday of Week 10	Individual	25%	1, 2, 3, 4, 5, 6
4	Final exam		Individual	35%	1, 2, 3, 4, 6

Late Submissions

The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Assignment 1

**Assessment Type
Description**

Written Assignment

A series of short-answer style questions, the two assignments meet the objectives of knowledge acquisition and demonstrated integration of data, upon reflection and analysis, to produce coherent and concise documents which convey evidence-based understanding of

	concepts, methods and applications. They are designed to enable students to apply skills developed in the lecture and workshop materials which will be used throughout their program and careers.
Weighting	20%
Due Date	23:55 Sunday of Week 5
Submission Method	Online
	Electronically via Canvas – this must be a single Word or PDF file
Assessment Criteria	Available on the course's Canvas
Return Method	Online
Feedback Provided	In class

Assessment 2 - QUIZ

Assessment Type	Quiz
Description	The quiz enables students to further gauge the effectiveness of their process for learning the course's concepts and applications. The assessment is based on the material covered in the lectures and weekly workshop activities up to and including Week 9. The quiz helps to identify any areas of concern a student, or the tutor/lecturer, may have and may stimulate discussion with course instructors. This is an invigilated assessment item held during the Week 10 workshop.
Weighting	20%
Due Date	Conducted in the Week 10 Workshop
Submission Method	In Class
	The assessment is to be submitted to course teaching staff during the timetabled session.
Assessment Criteria	Available on the course's Canvas
Return Method	Not Returned
Feedback Provided	None

Assessment 3 - Assignment 2

Assessment Type	Written Assignment
Description	A series of short-answer style questions, the two assignments meet the objectives of knowledge acquisition and demonstrated integration of data, upon reflection and analysis, to produce coherent and concise documents which convey evidence-based understanding of concepts, methods and applications. They are designed to enable students to apply skills developed in the lecture and workshop materials which will be used throughout their program and careers.
Weighting	25%
Due Date	23:55 Sunday of Week 10
Submission Method	Online
	Electronically via Canvas – this must be a single Word or PDF file
Assessment Criteria	Available on the course's Canvas
Return Method	Online
Feedback Provided	In class

Assessment 4 - Final exam

Assessment Type	Formal Examination
Description	Formal Examination
Weighting	35%
Due Date	Formal Examination period
Submission Method	If the exam proceeds as a face-to-face, invigilated exam as planned, students will be permitted a non-programmable scientific calculator. However, instruction booklets or cards for the calculator are not permitted in the exam. If instead the exam is held online, it will be an OPEN BOOK exam. While there are no restrictions placed on resources available during an OPEN BOOK exam, the University's academic integrity rules, including those relating to assistance from other people, will apply.
Assessment Criteria	Available on the course's Canvas
Return Method	None
Feedback Provided	None

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or
2. the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
3. you are requesting a change of placement; or
4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items

Procedure available at:
<https://policies.newcastle.edu.au/document/view-current.php?id=236>

**Important Policy
Information**

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at <https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures> that support a safe and respectful environment at the University.

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.

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