Course Outline

ZEIT8231 Test and Evaluation – S2 2017
Distance Mode

Course Staff

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I am are available for consultation but please email or phone first to make a mutually suitable time. If I am unavailable you may contact Liz by e-mail: seit.teaching@adfa.edu.au.

Course Details (or Introduction/Context)

This course is one of the four compulsory courses in the Master of Systems Engineering program. No prior knowledge is presumed, but prior (or concurrent) completion of *ZEIT8226 Systems Engineering Practice* would be beneficial.

Test & Evaluation (T&E) provides an understanding of the processes and management associated with test and evaluation as part of the system engineering discipline. The course also introduces the tools, plans, and documents commonly used in T&E and details how T&E coexists with other disciplines (particularly systems engineering and project management).

T&E is a systems engineering management function that ensures a coordinated and consistent testing effort is applied to the system for the entire system life cycle. By coordinating the T&E from a system perspective, the focus and emphasis of the testing can be varied with different life-cycle phases without compromising the entire T&E effort. T&E is significant for both the customer and the contractor.

A thorough evaluation of a system involves validating the system against the original customer requirements. Obviously, this full validation cannot be completed until the entire system has been designed, developed, and constructed, and then operated in the intended operational environment by operational personnel. The aim of system T&E is to test and evaluate the system progressively as it passes through the various development phases in order to avoid costly and time-consuming modifications to the system design late in the life cycle. With this in mind, progressive test and evaluation is both a risk mitigation measure and project performance measure that provides a high degree of confidence early in the system life cycle that the design is tracking to perform as required.

Student Learning Outcomes

The major goal of this course is to provide you with an opportunity to develop an enduring understanding of the processes and management practices associated with test and evaluation as part of systems engineering. Most importantly, you will have applied this knowledge to a practical example as a vehicle for reinforcing the learning on the course.

Formally the subject learning outcomes are:

1. Describe roles of T&E in Systems Engineering and Project Management as applied to system design and capability acquisition lifecycles, including validation methods, verification methods and categories, configuration baselines and functional and physical configuration (FCA/PCA) auditing; and complexity issues for Systems-of-Systems (SoS) and Families-of-Systems (FoS).

2. Compare the types of T&E and their contemporary issues, including preview T&E (pre-contract), developmental T&E, acceptance T&E, operational T&E, and speciality T&E such as: anthropometrics and human factors, environmental qualification, electromagnetic effects, software usability, and cybersecurity.

3. Develop T&E concepts documents (TCDs) and T&E master (management) plans (TEMPs) within an hierarchy of project plans using structured risk-based approaches.

4. Describe requirements of T&E conduct plans and reports.

5. Develop hierarchical and traceable T&E measures for capability systems, including critical operational issues (COIs) and measures of effectiveness/suitability (MOEs/MOSs) at the customer-level or needs-level, and measures of performance (MOPs) and technical performance measures (TPMs) at the design-level or specification-level.

6. Describe organisational management of T&E including independence, dedicated T&E managers and T&E agencies, project-based T&E, contractor-based T&E, governance of T&E, and principles of good T&E management.

7. Recognise the impact of systems variability on T&E and the associated need for rigour in test methodology

and data analysis such as design of experiments (DOE).

Coupled with ZEIT 8034 Advanced T&E Techniques which focuses on the test design methodology and data analysis, these two courses are intended to cover all the education you need to achieve the 25 T&E competencies listed by the U.S. Defense Acquisition University for work in this field.

Developing Graduate Attributes

The major goal of this course is to provide you with an understanding of test and evaluation as part of the system engineering discipline. The assignment tasks require engagement with the information presented, applying the material to typical situations. This exercises your ability to analyse a problem using the newly learned techniques, and synthesise appropriate test methodologies. The assignment tasks are submitted as written reports in a similar format to those used to communicate test and evaluation plans in typical projects. The focus of this course is on developing the following graduate attributes:

1. GA2 an in-depth engagement with the relevant disciplinary knowledge in its interdisciplinary context;
2. GA3 the capacity for analytical and critical thinking and for creative problem solving; and
3. GA12 the skills of effective communication.

Assessment Requirements

The marks for this course will be allocated to three quizzes and three assignments, in the following way:

Quiz – Sections 1-2	10%	2200 Eastern 6 Aug 17
Assignment 1(Pt A) online post	5%	2200 Eastern 13 Aug 17
Assignment 1(Pt B) online critiques	10%	2200 Eastern 20 Aug 17
Quiz – Sections 3-4	10%	2200 Eastern 20 Aug 17
Assignment 1(Pt C) TCD	10%	2200 Eastern 27 Aug 17
Assignment 3 – Variation in T&E	10%	2200 Eastern 3 Sep 17
Assignment 2(Pt A) – Outline Plan	5%	2200 Eastern 10 Sep 17
Quiz – Sections 5-7	10%	2200 Eastern 17 Sep 17
Assignment 2(Pt B) T&E Plan	30%	2200 Eastern 15 Oct 17

LATE SUBMISSION OF ASSESSMENT

The assignments are to be submitted via Moodle before the due date above. Assignments submitted after the due date will receive the following penalties—in marks subtracted from the assignment mark:

Date of submission	Penalty
A ten mark assignment	
One week late	1 mark/10
Two weeks late	2 mark/10
A 30 mark assignment	
One week late	3 marks/30
Two weeks late	6 marks/30

To make it clear, an assignment graded at 22/30 but submitted with a 3 mark penalty would be awarded a final grade as follows: 22-3=19/30.

Submissions received after the final submission date in the table above will not be marked and a result of 'zero' will be awarded for the assignment.

No extensions are possible without a formal request for special consideration (see policy link below). Please note that the policy states that: "Work commitments are not normally considered a justification."

Please note that lecturer support may NOT be available after the original submission date.

You must achieve at least 50 marks out of a total 100 marks to pass this course. You are not required to pass any one particular piece of assessment; you simply need to pass the course overall. Final marks in this course may be moderated.

Quizzes
Three, thirty-minute, open-book on-line (moodle) quizzes will be conducted as scheduled in the assessment table. There are 15 questions in each quiz drawn in random from a database. Students are not to record questions in any way for the benefit of other students. Students are only permitted two attempts for Quiz One and one attempt for the second and third quiz.

Quiz questions are predominately drawn from the applicable chapters of the notes and their associated revision questions, although additional readings on moodle for each chapter will help synthesise the information for more challenging questions and the assignments.

A practice quiz is on Moodle to ensure your computer has the right interface to support the quizzes. Students are to run this practice quiz well before doing Quiz 1.

Assignments

The assignments are available on Moodle. Assignment One is about test metrics and test concept planning and is done by all students on a topic set by UNSW. Assignment Two practices more T&E metrics on a topic of the student's choice and has them write aspects of a master T&E plan at the contractual stage of a project. So as to ensure a suitable topic for the second assignment, students submit an outline plan to UNSW Canberra for concurrence. Assignment three is a short assignment to appreciate the impact of variation in systems on test planning.

The assignments are due on the dates specified in the assessment table. Each assignment is to be submitted in soft copy via Moodle by **2200h** Canberra time on the appropriate day. PDF format is preferred. All assignments must have the UNSW cover sheet signed by all submitting students attesting to originality or they cannot be marked and will be given a zero grade.

Outcomes-Assessment Matrix

Assessment item	GA2	GA3	GA12
Quizzes	X		
Assignment 1	X	X	X
Assignment 2	X	X	X

Teaching Strategies

Students should work progressively through the seven chapters of course notes and any associated additional readings for each chapter (available on the Moodle web site) accessible from https://moodle.telt.unsw.edu.au/login/index.php). Read the chapter(s) noted in the course schedule and any associated additional readings, complete the review questions at the end of the chapter, and before the due date, do the applicable on-line quiz. The review questions enable you to revisit significant information from the chapter and gain experience with the relevant information and techniques. The assignments provide an opportunity to extend this theoretical knowledge into practical skills.

The on-line Moodle posting of the T&E metrics, followed by two formal peer critiques by each student is an important opportunity to check the broad interpretation of the metrics and their conformance to theory, as you would do with project stakeholders in a real project.

Note that a student's critique of another student's T&E metrics is what is marked and is then assigned to the critiquing student not the student who posted. In other words, students are marked for the quality of their initial post (5%) and the incisiveness and constructiveness of their two critiques of other students' posts (5% each).

The submission of an outline before writing the individual assignment is both an opportunity to check the suitability of the individual assignment topic with the lecturer and assisting markers, but also a real-life best practice to check consensus with stakeholders before committing to detailed master test plan writing.

Academic Honesty and Plagiarism

Plagiarism is using the words or ideas of others and presenting them as your own. Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement.

For more information, please refer to the UNSW Canberra Academic Misconduct website (https://my.unsw.edu.au/student/academiclife/assessment/StudentConductPolicy.html).

Resources for Students

There is no required text for this course—students are required to study the set of course notes and additional readings/videos made available through Moodle. Suggestions of further readings are available on Moodle and includes access through the UNSW library to the Journal of the International T&E Association (ITEA).

Moodle

https://moodle.telt.unsw.edu.au/login/index.php (zPass required).

For enrolment and login issues contact:

IT Service Centre

Email:	itservicecentre@unsw.edu.au
Internal:	x51333
External:	(02) 9385-1333
International:	+61 2 9385 1333

For ALL other Moodle issues:

External TELT Support

Email:	externalteltsupport@unsw.edu.au
Internal:	x53331
External:	(02) 9385-3331
International:	+61 2 938 53331

UNSW Moodle supports these web browsers:

Recommend Win 7, Mac OSX 10.7+:

» Internet Explorer 9.0+
» Mozilla Firefox 15+
» Google Chrome 22+
» Safari 6+
** Google Chrome is recommended for optimal compatibility
** Add ons and Toolbars can affect the browsers performance.

Course Schedule

Students will need to complete the study of the body of knowledge in the supplied course notes with the following program.

Phase	Dates	Topic
Sections 1-2	24 Jul – 6 Aug	Check Practice Quiz works from your computer Read Notes & associated readings for Chapters 1-2, complete revision questions
Quiz 1	6 Aug 17	Undertake Quiz 1
Section 3 Ass 1 Pt A	7-13 Aug 17 13 Aug 17	Read Notes & associated readings Chap' 3, prepare Ass' 1 metrics Post T&E metrics
Section 3-4 Ass 1 Pt B	14-20 Aug 17 20 Aug 17	Read Notes & associated readings Chap 4 Critique T&E metrics Post critiques of T&E metrics
Quiz 2	20 Aug 17	Undertake Quiz 2
Section 4 Ass 1 Pt C	21-27 Aug 17 27 Aug 17	Prepare Ass' 1 TCD Submit
Section 3 - Variation Ass' 3	28 Aug – 3 Sep 17 3 Sep 17	Review video workshop on variation in systems Complete Ass' 3 Submit
Sections 5-7 Ass 2 Pt A Quiz 3 Ass 2 Pt A Ass 2 Pt B Ass 2 Pt B	4 Sep – 15 Oct 17 10 Sep 17 17 Sep 17 18 Sep 17 18 Sep – 15 Oct 17 15 Oct 17	Read Notes & associated readings Chapters 5-7 Submit Undertake Review Feedback Prepare Ass 2 Pt B Submit

Course Evaluation and Development

Your feedback is important and will be collected at the end of the course. The course is modified each year based on specific feedback from past students.