Mechanical and Manufacturing Engineering

Course Outline

MANF4611

PROCESS MODELLING AND SIMULATION

Contents

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You should aim to spend about 15 h/w on this course. The additional time should be spent in making sure that you understand the lecture material, completing the set assignments, further reading, and revising for any examinations.

Week	Lecture Content	Lab Content
6	**Simulation Modeling Techniques and Strategies Part II** Arena variables, logic control and expressions: Variables, Attributes, Record, Assign, Expressions, Separate, Batch, Decide Data manipulation	Further Arena Modelling Demonstration Set 4 On-going Arena support for Assignments
7	**Verification, Validation and Documentation of Models** Verification and Validation Model Documentation	Further Arena Modelling Demonstration Set 5 On-going Arena support for Assignments
8	**Creating Simulation Scenarios, Generating Data and Analysis of Output** Within Across Replication Statistics Types of Statistical Variables Confidence Intervals and Determining the Number of Replications Sequential Sampling Interpreting Arena Output Files Finite Infinite Horizon Simulations Effect of Initial Conditions, Warming-up Period Comparison of Different System Configurations and Designs	Further Arena Modelling Demonstration Set 6 On-going Arena support for Assignments
9	**Design of Experiment Theory (DOE)**	

6. [redacted]

Assessment overview

Assessment	Group Project? (# Students per group)	Length	Weight	Learning outcomes assessed	Assessment criteria	Due date and submission requirements	Deadline for absolute fail	Marks returned
Group assignment 1	Yes (4)	20 minutes VIVA	10%	1, 2,3 and 4	Process flowchart and scope	VIVA Week 3	Friday Week 5	On-the-spot feedback VIVA
Group assignment 2	Yes (4)	20 minutes VIVA	20%	1, 2,3 and 4	Model design, data structures, verified	VIVA Week 7/8	Friday Week 9	On-the-spot feedback VIVA
Group assignment 3	Yes (4)	2500 words	30%	1, 2,3 and 4	Design of Experiment, simulation, statistical analysis, documentation	Friday 5pm, Week 11	Friday Week 12	Upon release of final results
Final exam	No	2 hours	40%	1, 2,3 and 4	All course content from weeks 1-11 inclusive.	Exam period, date TBC	N/A	Upon release of final results

Marking

Marking guidelines for assignment submissions will be provided at the same time as assignment details to assist with meeting assessable requirements. Submissions will be marked according to the marking guidelines provided.

The following criteria will be used to grade Viva examinations (Detailed instructions will be posted on Moodle):

> The level of progress achieved by the team at Stages 1 and 2 of the assignment. Stage 1 focuses on understanding the process flow and logic (flow charts and documentation) as well as identifying the issues, aims and scope of the model. Stage 2 needs to deliver a model, coded in Arena, appropriately verified, validated and documented that will be the engine for generating data from appropriate scenarios that the team will test and analyse (and ultimately submit as Part 3 of the assignment).

August for T2, and November/December for T3.

Please visit myUNSW for Provisional Examination timetable publish dates.

For further information on exams, please see the Exams webpage.

Calculators

You will need to provide your own calculator of a make and model approved by UNSW for the examinations. The list of approved calculators is available at student.unsw.edu.au/exam-approved-calculators-and-computers

It is your responsibility to ensure that your calculator is of an approved make and model, and Engineering Student Supper Services Centre

into the examination room.

Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to submitting an assessment or sitting an exam.

Please note that UNSW now has a Fit to Sit / Submit rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the Special Consideration page.

7. [illegible]

References

Simulation modeling and analysis with Arena, Tayfur. Altiok Benjamin Melamed, Warren, N.J. : Cyber Research and Enterprise Technology Solutions, 2001. UNSW Library High Use Collection.

Design and Analysis of Experiments, Douglas C. Montgomery, Wiley, 8th Edition

nBT/F10049>1480521i.24 174.5 297.53 cm/Image145 Do Q EMC /Span AMCID 34/Lang (en-GB)>BDC q0.000008842vcG

Simulation Modeling and Arena, M.D. Rossetti, John Wiley & Sons, 2009.

UNSW Library website: https://www.library.unsw.edu.au/
Moodle: https://moodle.telt.unsw.edu.au/login/index.php

8. Course evaluation and development

Feedback on the course is gathered periodically using various means, including the UNSW myExperience

Competencies

Stage 1 Competencies for Professional Engineers

	Program Intended Learning Outcomes
PE1: Knowledge and Skill Base	PE1.1 Comprehensive, theory-based understanding of underpinning fundamentals
	PE1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing
	PE1.3 In-depth understanding of specialist bodies of knowledge
	PE1.4 Discernment of knowledge development and research directions
	PE1.5 Knowledge of engineering design practice
	PE1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice
PE2: Engineering Application Ability	PE2.1 Application of established engineering methods to complex problem solving
	PE2.2 Fluent application of engineering techniques, tools and resources
	PE2.3 Application of systematic engineering synthesis and design processes
	PE2.4 Application of systematic approaches to the conduct and management of engineering projects
PE3: Professional and Personal Attributes	PE3.1 Ethical conduct and professional accountability
	PE3.2 Effective oral and written communication (professional and lay domains)
	PE3.3 Creative, innovative and pro-active demeanour
	PE3.4 Professional use and management of information
	PE3.5 Orderly management of self, and professional conduct
	PE3.6 Effective team membership and team leadership