Course Webpage https://subjects.ee.unsw.edu.au/elec9732/

Nonlinear Control - ELEC9732
Term III 2019

Instructor:	Prof V. Solo	
E-Mail:	v.solo@unsw.edu.au	[use subject: ELEC 9732]
UOC:	6	
Class Times:	Tuesday, 6pm-9pm	Room: **Ainsworth 102**

Week 1 only, **extra lecture** Friday 6pm-9pm

Prerequisites: Undergraduate Control Course

Aims: Provide an introduction to nonlinear systems analysis and an introduction to nonlinear control design.

Assessment:

Homeworks	50%
Final Exam (Take-home)	50%

Homeworks are to be completed on your own.

You cannot discuss with others.

You cannot copy from any source.

The work that you hand in (and any related working) must be yours alone.

Exams are to be completed on your own.

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Resources:	**Software:**	Matlab
	Textbook:	none.
	References:	in Library Open Reserve

i JJ Slotine, W Li (1991). Applied Nonlinear Control (Prentice Hall)
ii H Khalil (1996,2002) Nonlinear Systems (Prentice Hall)
iii S Sastry (1999) Nonlinear Systems (Springer).
iv A Isidori (1995) Nonlinear Control (Springer).

Timetable for **Homeworks, Exam**

Item	Dates(week)	<u>Late</u> Homeworks are penalized.
HW 1	out - week 3	due - week 5, $\begin{smallmatrix}Homework\\Box\end{smallmatrix}$ opposite $\begin{smallmatrix}School\\Office\end{smallmatrix}$
HW 2	out - week 5	due - week 7, Homework Box
HW 3	out - week 7	due - week 9, Homework Box
Final Exam	out - $\begin{smallmatrix}Tuesday\\November\ 19\end{smallmatrix}$(week 10)	due - $\begin{smallmatrix}Friday\\November\ 29th\end{smallmatrix}$, 4pm, PDF by EMAIL ONLY

Teaching Strategies

Lectures	to give the basic material in written form, and to highlight the importance of different sections and help with the formation of schema.
Assignments	to give practice in problem solving, and to assess your progress.
Examination	the final test of competency.

Learning Outcomes

At the end of the course the student will be familiar with basic aspects of nonlinear systems and control, from both an analysis and a design point of view. The student will be able to use this knowledge to solve basic problems in nonlinear systems anaysis and nonlinear control design.

Academic Honesty and Plagiarism

Plagiariam means <u>copying</u>. You cannot copy other peoples work of any kind; you cannot copy from any source. Plagiarism is a serious offence and (severe) penalties will apply; see https://student.unsw.edu.au/plagiarism

Administrative Matters

For special needs, equity and diversity, occupational heath and safety, enrolment, rights, and general expectations of students; see http://scoff.ee.unsw.edu.au/.

Week	Lecture	Topic
i	1	Introduction
	2	Nonlinear Ordinary Differential Equations
ii	3	Phase Plane Methods
iii	4	Lyapunov Stability
iv	5	Input/Output Stability
v	6	Describing Functions
vi	7	Nonlinear Control - Introduction
vii	8	Feedback Linearization
viii	9	State Feedback Linearization
ix	10	Gain Scheduling
x	11	Sliding Mode Control
	12	Backstepping Design Method