



Module Code: EJ130010D	Version: 1 Date Amended 9 th December 2005
-------------------------------	---

1. Module Title: <i>maximum 100 characters</i>
Mechatronics

2a. Module Leader:	2b. Department:	2c. Faculty:
S Yousef	Computing and Technology	Science and Technology

3a. Level: <i>see guidance notes</i>	3b. Module Type: <i>see guidance notes</i>
1	Standard

4a. Credits: <i>see guidance notes</i>	4b. Study Hours: <i>see guidance notes</i>
30	300

5. Restrictions	
Pre-requisites:	None
Co-requisites:	None
Exclusions:	none
Pathways to which this module is restricted:	Technology Pathways

LEARNING, TEACHING AND ASSESSMENT INFORMATION (for inclusion in the Module Guide)

6a. Module Description: <i>200 – 300 words</i>

This module provides the student with an introduction to the analysis and design fundamentals of basic electronic systems in mechanical and electrical engineering. The module will review circuit fundamentals that are related to basic building blocks for analogue/ digital circuit design and mechanical science.

Analogue devices comprising various forms of diode, transistor and integrated circuits will be introduced and their equivalent circuit models will be explained for circuit design.

Number systems and Digital Devices such as logic and memory elements will be established and various techniques explained for design simplification.

Mechanical and electrical actuation systems will be introduced which discusses various forms of mechanisms. Peripheral Interface Controllers are also established.

The principles of operation of all circuit elements are covered by lecture, tutorial and computer simulation.

Students carry out a group(s) assignment on the Joystick project which is designed to satisfy Engineering Applications 1 of the Engineering Council. Students are required to submit an individual report based on their findings. Assessment is by coursework and exam.

6b. Outline Content:

- Analogue and digital transducers for mechanical and electronic interfacing.
- Diode (p-n junction, zener, tunnel), Transistor (BJT, JFET, MOSFET). Operational amplifier, comparator. (positive and negative feedback).
- PIC fundamentals, ladder logic.
- CAM and CAM followers. Simple gear trains and mechanical, pneumatic, hydraulic actuation systems.
- Belt and train drives.
- Electrical actuation systems. (d.c, a.c, and stepped motor fundamentals)
- Dynamic responses of systems. Effect of damping.
- Number systems (Binary, octal, denary, hexadecimal) Negative representation.
- Boolean algebra and combinational logic applications.
- Introduction to SR, D, JK memory elements.
- Circuit simulation using suitable mechanical and electronic software packages,

6c. Key Texts/Literature:	
Text:	
Bolton. W (2000) Mechatronics	Longman 2 nd Edition ISBN 0 582 35705 5
Loveday G. C. (1993) Digital and Analogue Electronics for HNC.	Longman 1 st Edition ISBN 0 582 08878 x
Morris J. C (1999) Analogue Electronics	Arnold 2 nd Edition ISBN 0 340 71925 7
Notes:	Course notes from Lecturer. Web notes.
6d. Specialist Learning Resources:	
Computers and electronic test equipment	

7. Learning Outcomes (threshold standards):	
	On successful completion of this module the student will be expected to be able to:
Knowledge and understanding	<ol style="list-style-type: none"> Understand the fundamentals of analogue and digital electronic building blocks. Use the theory to analyse and design simple analogue and digital electronic circuits.
Intellectual, practical, affective and transferable skills	<ol style="list-style-type: none"> Appreciate the tolerance of practical component values. Apply circuit theory to practical systems.

8. Learning Activities			
Learning Activities	Hours	Learning Outcomes	Additional Comments (including details of use of web-CT)
Teacher managed learning:	72	1,2,3	
Student managed learning:	228	1.2.3.4	
TOTAL	300		

9. Assessment		
Assessment Method	% contribution to module mark or P/F	Learning Outcomes
Examination	70	1,2,4
Coursework /Assignment	30	1,2,3,4
<p>In order to pass this module, students are required to achieve an overall mark of 40%</p> <p>In addition, students are required to (a) for each element of fine graded assessment listed above, achieve a minimum mark of 30% (or higher - see Module Guide) and (b) pass any pass/fail elements</p>		

OTHER TECHNICAL DETAILS

10. Delivery of the Module <i>Please delete as appropriate</i>					
Delivery	This module is delivered over...	Yes or No?	Indicate which by deleting as appropriate		
1	...a single semester	N	Semester 1	Semester 2	
2	...two semesters	Y	Semester 1	Semester 2	
3	...a single trimester	N	Trimester 1	Trimester 2	Trimester 3
4	...two trimesters	N	Trimester 1	Trimester 2	Trimester 3
5	...three trimesters	N	Trimester 1	Trimester 2	Trimester 3
6	...multiple delivery patterns	N			
7	... an exceptional delivery pattern	N	Give details (see guidance notes)		

11. Learning Activities – further details				
Learning Activities		Details of duration and frequency of learning activities		
Teacher managed learning:		24 weeks 1.5 hours lectures per week 1.5 hours supervised lab/tutorial sessions per week		
Student managed learning:		Weekly. 9.5 hours		
12. Module Assessment – further details				
Method	Length/duration	Fine graded (FG) or pass/fail (PF)	Minimum Qualifying Mark <i>see guidance notes</i>	Comments
Exam	3 hours	FG	40%	Professional body requirements
Assignment	1500 words	FG	40%	Professional body requirements
13. Subject: <i>see guidance notes</i>				

