Course Outline (Higher Education)

School: School of Engineering, Information Technology and Physical Sciences

Course Title: MEASUREMENT AND COMPUTER INSTRUMENTATION

Course ID: ENGIN2402

Credit Points: 15.00

Prerequisite(s): (ENCOR1000 or ENCOR1021 or ENGIN1002)

Co-requisite(s): Nil

Exclusion(s): (ENMTX2020 and ETMEC3260)

ASCED: 030101

Description of the Course :

This course will enable a student to develop understanding on principles of measurement and instrumentation including transducers theory and practice, data acquisition and data logging systems, intelligent measurement systems and virtual instrumentation. Also, thorough this course a student is expected to develop confidence in the specification of physical data with respect to both rectangular and polar coordinate systems.

Grade Scheme: Graded (HD, D, C, etc.)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the course but gained a final mark of 45 per cent or above and submitted all major assessment tasks..

Program Level:

Level of course in Program	AQF Level of Program					
	5	6	7	8	9	10
Introductory						
Intermediate			✔			
Advanced						

Learning Outcomes:

On successful completion of the course the students are expected to be able to:

Knowledge:

K1. Explain the principles of engineering measurement and of instrumentation.
K2. Identify the type of errors in a measurement using meters.
K3. Explain transducers and their role as input to instrumentation system.
K4. Describe modern data logging and instrumentation systems.

Skills:

S1. Analyse errors in analogue measurement using meters.
S2. Analyse data acquisition systems and data logging systems.
S3. Identify and solve problems that may occur in data transmission.
S4. Use oscilloscopes confidently in making measurements.

Application of knowledge and skills:

A1. Use of data acquisition and data logging systems.
A2. Use of appropriate measurement and instrumentation techniques within an engineering system / process.

Course Content:

Topics may include:

- Introduction of the principles of engineering measurement and of instrumentation.
- Introduction to the basic types of measurement and to the procedures for identifying and adjusting gross errors, systematic errors and random errors.
- The application of transducers in engineering data processing systems together with the application of the oscilloscope in measuring analogue or digital waveforms.
- Introduction to the principles of operation of transducers and the conditioning of their output signals for recording and analysis.
- Principles of data acquisition.

Values:

V1. Appreciate the use of measuring equipment to examine and assess quantities of various nature in engineering processes.
V2. Contribute to a discussion related to measuring equipment and measuring techniques of different mechatronics systems.

V3. Assess, independently, and appreciate the suitability of measuring techniques for a specific process.

Graduate Attributes

The Federation University FedUni graduate attributes (GA) are entrenched in the Higher Education Graduate Attributes Policy (LT1228). FedUni graduates develop these graduate attributes through their engagement in explicit learning and teaching and assessment tasks that are embedded in all FedUni programs. Graduate attribute attainment typically follows an incremental development process mapped through program progression. **One or more graduate attributes must be evident in the specified learning outcomes and assessment for each FedUni course, and all attributes must be directly assessed in each program**

Graduate attribute and descriptor		**Development and acquisition of GAs in the course**			
		Learning Outcomes (KSA)	**Code** A. Direct B. Indirect N/A Not addressed	**Assessment task (AT#)**	**Code** A. Certain B. Likely C. Possible N/A Not likely
GA 1 Thinkers	Our graduates are curious, reflective and critical. Able to analyse the world in a way that generates valued insights, they are change makers seeking and creating new solutions.	K1, K2, K3, K4, S1, S2, S3, S4, A1, A2	A	1, 2, 3	A
GA 2 Innovators	Our graduates have ideas and are able to realise their dreams. They think and act creatively to achieve and inspire positive change.	K1, K2, K3, K4, S1, S2, S3, S4, A1, A2	A	1, 2, 3	A
GA 3 Citizens	Our graduates engage in socially and culturally appropriate ways to advance individual, community and global well-being. They are socially and environmentally aware, acting ethically, equitably and compassionately.	K1, A2	B	1, 2, 3	C
GA 4 Communicators	Our graduates create, exchange, impart and convey information, ideas, and concepts effectively. They are respectful, inclusive and empathetic towards their audience, and express thoughts, feelings and information in ways that help others to understand.	K1, K2, K3, K4, A2	B	1, 2, 3	B
GA 5 Leaders	Our graduates display and promote positive behaviours, and aspire to make a difference. They act with integrity, are receptive to alternatives and foster sustainable and resilient practices.	K1, K2, K3, K4, S1, S2, S3, S4, A1, A2	B	1, 2, 3	C

Learning Task and Assessment:

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
S1-S4, A1-A2	Experimental work and / or projects to verify students ability to apply knowledge and skills acquired in the course	Reports, demonstrations	10 - 30%

Learning Outcomes Assessed	Learning Tasks	Assessment Type	Weighting
K1-K4, S1-S4	Relevant tasks and problems to enforce understanding of the students and help in gradual development of knowledge and skills throughout the course	Assignments, quizzes	10 - 30%
K1-K4	Questions and problems related to the course contents	Mid and / or End of semester examination	40 - 60%

Adopted Reference Style:

Other (IEEE: Refer to the library website for more information)