

School of Electrical & Information Engineering
University of the Witwatersrand
ELEN 4006 - Measurement Systems

Course Project Brief 2017

1 The Project

OPTION ONE For the 2017 project students will have to identify a unique measurement application and then design, analyse and report on a suitable “smart” instrumentation measurement system with a bandwidth of at least 100Hz to be used for **agricultural (i.e. farming operation)** application. Any type of application, excluding temporarily installed applications, may be considered. **There is a restriction of one student group per application.** A group is formed by finding a partner. Any odd member shall be assigned by the lecturer to a random group to form a group of three. Components for the system may not include any used in any previous project undertaken for your degree. (**i.e. No components, sensors or microprocessors used for the third year project.**)

OPTION TWO Students will choose from a list of measurement systems representing various high performance and special case measurement systems. If successful in being considered for any of these measurement systems in this option the students will stand a higher chance in submitting a paper as a co-author to a rated journal or conference. See Addendum 1 of Selected List of Projects (see course homepage)

A measurement application is only uniquely yours after the proposal has been approved.

You will be required to complete the following:

1. Determine a suitable application.
2. Submit a one A4 page giving all the requirements (including both static and dynamic specifications) of the application for approval. Approval for you to continue with the project will be given after your submission.
3. Investigate currently used measurement systems for your application.
4. Design a “Smart Transducer” measurement system [1], complex enough to contain all the elements contained in Bentley’s generalised model of a measurement system [2, page:16].
5. Analyse the system to enable a full specification of the system to be presented in your report.
6. **Must provide the detailed results of running tests from tools such as Matlab, PSpice.**
7. Submit a report as described in section 2 by the due time and date as reflected on the **Key Dates** list.
8. Upon Approval of Proposal a group will be assigned an Oral Presentation date; students are to be available at 08:00hrs on the date of their presentation and lateness is deemed as UNACCEPTABLE for assessment purposes.
9. All **ECSA ELOs** as outlined in the CB&O must be met in the Report and as well as the Oral.

As stated, in the course brief and outline, “The main content of the lectures will be to discuss project related concepts and problems”.

Each student group will be required to make a presentation on their particular measurement and measurement system.

2 The Report

1. Reports in a “paper” format must be no longer than five A4 sides typed in **11 point typeface or larger**. The report must follow the guidelines given the booklet “Communication and the

Engineer". If you have not got one ... **GET ONE!!!**

Additional page/s with only the complete circuit diagram of your system may be attached.

Reports not conforming to specifications will be penalised.

2. The report must contain sections describing all the work as described in section 1 including:
 - A table giving the static specifications of your system.
 - A detailed plot of the dynamic response of the system.
3. Not more than 20% of the references may be web or Internet articles.
4. Reports must be placed in the box at reception by the published deadline.

NB: Late reports : See School Policy on late reports

3 Project marks

The project will be marked in terms of the ECSA outcomes using the Course Project assessment forms. One third of the project marks shall be apportioned to the group Oral Presentation that shall be done during lectures.

Please Note: Unacceptable in any of the categories will result in failure of the project and also failure of the course. This means that if the Oral presentation which is part of the project assessment is unacceptable in any way then one of the categories of the project will have been failed and the course will also be failed. Late arrival for Presentation is deemed as unacceptable

4 Notes for students

1. The intention of the course project is not for the student to supply a shopping list of "off the shelf" systems and sub-systems but to design such systems to enable the required measurement. If in doubt, discuss this with the course lecturer, **whose decision is final.**
2. The specifications given are deliberately vague. You will have to visit the University's libraries to obtain information. You should consult with your lecturer, though he usually answers a question with a question.
3. The length of the report has been chosen with care. It will require time to produce a short report. Use the guide.
4. The time allocated to the project is as follows:
 - Total time / week = 55 hours
 - Number of subjects = 6
 - Hours / subject = 9 hours
 - 2 lectures = 1,5 hours
 - Consolidation of lecture material = 2 hours
 - Time for project = 5,5 hours / week
 - Total time for project = 44 hours over 8 weeks

This includes the third allocated period, which can be used to consult with the lecturer at your request.

5. **ENJOY !!!!**

References

- [1] M.V. Shuma-Iwisi and G.J. Gibbon. Smart transducers: A reconstructed definition and a link to microcontrollers. *1st African Control Conference (AFCON 2003)*, Cape Town, 2003.

[2] J.P. Bentley. Principles of measurement systems. *4th Edition*, Harlow, England: Pearson, 2005.

©Copyright School of Electrical and Information Engineering, All Rights Reserved