

I. IDENTIFICATION DATA

Thesis name:	Alcohol content measurement within the fermentation process.
Author's name:	Gil Goldman
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Dept. of Control Engineering
Thesis supervisor:	Doc. Ing. Jiří Novák, Ph.D.
Supervisor's department:	Dept. of Measurement

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	ordinarily challenging
<i>Evaluation of thesis difficulty of assignment.</i>	
Assignment theme comes from student. I found it interesting as number of small breweries is quickly increasing worldwide.	

Satisfaction of assignment	fulfilled with minor objections
<i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	
All assignment points were fulfilled except of the fourth one, which was, nevertheless, optional. The reporting of predicted final time of fermentation process to user is not finished. Its incorporation should not be a serious issue taking into account the computing platform, which is equipped with the wireless interface.	

Activity and independence when creating final thesis	B - very good.
<i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i>	
Student was active over the whole period of work. It introduced the topic of assignment, read additional literature and he was in close relation with several home brewery owners. Also within the second half of working period he was active, but without personal consultations, using only email. This is probably the reason why the final results are not so good as they could be, as some issues were identified too late.	

Technical level	D - satisfactory.
<i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	
The idea for very low-cost technology based on hydrometer displacement measurement is interesting. Student designed and implemented a measurement system that fulfils user requirements. I miss more detailed analysis of results focused on influence of disturbing physical quantities and evaluation of results measured within real beer brewing process, which were not available in time.	

Formal and language level, scope of thesis	B - very good.
<i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i>	
Thesis is easy to read, author's interest in topic is clearly visible. There are some mistypes and language errors but they do not affect readability of the text.	

Selection of sources, citation correctness	A - excellent.
<i>Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.</i>	
All sources are correctly cited.	

Additional commentary and evaluation

Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.

Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

Analytic and implementation parts of thesis are very good, deeper analysis of results and results from actual brewing process are missing.

I evaluate handed thesis with classification grade **C - good**.

Date: **12.6.2018**

Signature: Jiří Novák

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Department:	Department of Control Engineering
Thesis reviewer:	Ing. Jan Vondraš Ph.D, MBA
Reviewer's department:	N/A

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment <i>Evaluation of thesis difficulty of assignment.</i>	ordinarily challenging
<p>The assignment is overall correctly balanced to show the student's ability to work with literature via analyzing existing measurement techniques of an alcohol content within the fermentation process in home breweries. Afterwards the student was to show an ability to work independently and choose best technique or combination thereof, implement in a prototype and evaluate performances of the prototype.</p>	

Satisfaction of assignment <i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i>	fulfilled with minor objections
<p>Overall the assignment was handled appropriately. The student has combined well existing hygrometer technique with an ultrasonic way of measurement of the hygrometer position. The level of details especially regarding positives and negatives of chosen solution is somehow limited/missing.</p>	

Method of conception <i>Assess that student has chosen correct approach or solution methods.</i>	correct
<p>The student correctly started by an evaluation of possible existing methods for a measurement of a fermentation process progress applicable for home beer brewing. Furthermore the choice of the hygrometer in combination of a measurement of its floating portion above fermenting fluid level is an interesting approach. However, choice of an ultrasonic measurement might not be a best choice as there is typically foam or remains of foam on the top of the fermenting fluid level that may impact the accuracy of measurements.</p>	

Technical level <i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i>	D - satisfactory.
<p>The technical level of the work had a certain width with perceived lack of the depth as noted in the examples below.</p> <p>For instance the student seemed to omit inclusion of the second most common technique within home brewing community being a use of a simple optical refractometer to determine remaining sugar content within the fermenting fluid. Describing gas chromatography approach seems little irrelevant for home brewers.</p> <p>Furthermore the thesis misses mentioning of cooling in figure 1.1 (rendering it uncomplete) and any discussion of the cooling process importance beside one sentence in point 1.5 of the thesis. Additionally it is little unclear why the humidity sensor was used at all and how the temperature and other drifts of the ultrasonic sensor would be addressed.</p> <p>Additionally there is missing overall picture of the sensor arrangement which leaves a reader without clear guidance to the proposed solution – how would be the ultrasonic sensor actually arranged to measure the floating hygrometer.</p> <p>Discussion on the cost seems very optimistic – missing labor, possibly potting of the equipment, enclosure and other items that would significantly contribute the final cost.</p>	

Formal and language level, scope of thesis

B - very good.

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

Command of the English language is good. Minor confusion as to use of words dissertation and thesis interchangeably. Would have preferred little more clarity in the thesis overall.

Selection of sources, citation correctness

B - very good.

Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.

Sources cited seemed chosen well and used throughout the thesis. Some chapters or their portions 1.3 (page 3), 1.6, 3.2 and others lacked references where it might have been appropriate.

Additional commentary and evaluation

Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.

Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

Overall the thesis is fairly well written and structured with clarity and content that is adequate to a bachelor level.

Taking the above mentioned details in mind the following questions I would like the following questions to be asked at the defense:

1. *What impact on the measurement would have the foam that is present on the top of fermenting fluid?*
2. *What impact on the measurement would have the environment temperature and time related drift of the ultrasonic sensor?*

I evaluate handed thesis with classification grade **C - good**.

Date: **12.6.2018**

Signature: Jan Vondraš