Examination and report

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Examination
The following parts are examined:
  • Active participation in the Problem Based Learning (PBL) group.
  • Active participation in the laboratory exercises.
  • Signal Processing Task (SPT) on ECG arrhythmia/ST-shift: Group work. Approved seminar presentation and written report.
  • Final report
When all parts are passed, the grade is determined by the grade of the final individual report.

Problem based learning group
Participation is mandatory in all four PBL meetings. If you for some reason are not able to attend a meeting, that must be approved by the examiner prior to the meeting and an extra task is then provided. Furthermore, it is required that all group members are active in the discussions leading to the learning goals (first meeting), that all group members collects information regarding the agreed learning goals (between meetings), and that all members share their knowledge (second meeting).

Laboratory exercise
Prepare by reading the document describing the laboration. You have to actively participate in the laboratory exercises and make sure that you have proper prerequisites.

Signal processing task on ECG arrhythmia/ST-shift: Group work
This SPT shall be solved in assigned groups of 3-6 students and documented in a group report. Details about the report content can be found in the document describing the task, ECG arrhythmia/ST-shift.
Final individual report

The rest of this document is about the final report. The report shall be written individually and contain the chapters described below. You may write the report in English or Swedish. A word count shall be included for each chapter and exceeding the maximal allowed word count will affect the grading. Note that the software code for the Signal Processing Tasks (see below), must not be included in the word counting.

Deadlines and content

The chapters that shall be included in that report will differ between each examination:

First examination of final report (deadline 2016-01-16):
A report with 2 chapters covering:
1. PBL Situation 1 - Origin of bioelectrical signals, signal conduction in nerves and muscles (max 2000 words).
2. Signal processing task (SPT) 2 - Neurological Applications: EEG, EP (max 1750 words).
   There is one optional problem in this task that increases the chances, but is not necessary, for a higher grade.

Second examination (deadline 2016-04-01):
A report with 2 chapters covering:
1. PBL Situation 1 - Origin of bioelectrical signals, signal conduction in nerves and muscles (max 2000 words). Same as first examination.
2. Signal processing task (SPT) 3 - Intramuscular EMG (max 1750 words).

Third examination (deadline 2016-08-27):
Same as second examination.

Grading

Each chapter in the report is classified as Failed, Acceptable or Good. In general, the following grading principles will be used:

- Grade 3 (ECTS C): Acceptable on both chapters in the report.
- Grade 4 (ECTS B): Acceptable on one chapter, Good on the other.
- Grade 5 (ECTS A): Good on both chapters.
The relative weight between biomedical and signal processing focus, when grading is approximately 50%-50%.

Individually written report

The report must have a cover page with a signed declaration that the student has individually written the report, that the text is the student’s own words, and that work of others is properly referenced. The declaration found at the course homepage should be used. Violation of an individually written report will result in the grade failed on the report and may also be reported to the disciplinary board of Linköping University as suspected plagiarism.

What is meant by “individually written report” may be obvious for many of you, but by experience, we know that students often have questions about this and that the way to write reports differs between educations and countries. Therefore, to avoid any misunderstandings, we give examples of what is not allowed when writing the report and what is:

<table>
<thead>
<tr>
<th>You are NOT allowed to:</th>
<th>You are allowed to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write the report together with anybody else nor discuss the actual contents of the report.</td>
<td>Discuss the PBL situations.</td>
</tr>
<tr>
<td>Replicate or translate text, word for word, from any source, including books, articles, student reports, internet sources, lecture slides etc.</td>
<td>Occasionally quote parts of or whole sentences or even short paragraphs. The quotations shall be placed within quotation marks and the source shall be properly referenced. Images copied from other sources shall also be referenced.</td>
</tr>
<tr>
<td>Use another student’s code for the signal processing task or collaborate when writing the code.</td>
<td>Discuss the SPT algorithms and coding in general terms (on a flow chart level) with other students.</td>
</tr>
</tbody>
</table>

You will find a short description how to handle references at the end of this document.

Signal processing task

The problems within the task have already been formulated in contrast to the PBL situations below.

This task shall be presented in an INDIVIDUALLY written report. In the report, you should present and discuss the results of your solutions, describe every step in the implementation (not only as comments in the code) and discuss pros and cons of the solutions. Please avoid references to the code in the report.

The report should include the following parts

1. Present principles and the rationale of your solution.
2. Shortly describe the implementation of your solution.
3. The results of applying your algorithm on appropriate signals. We encourage you to
present and refer to graphs when applicable. However choose the graphs carefully and avoid pitting them into an appendix at the end.

4. In a discussion, relate your results to the relevant theory and explain the merits and deficits of your solution (which alternative solutions exist?). It is always better to discuss the deficits than to try to hide them.

5. Include the software code as an Appendix.

PBL situations

The PBL situations should be treated in a relevant way, which means that you should identify, formulate and treat/solve a number of problems that are relevant for the situations and that lie within the main and thematic goals for the course. You shall not report all your knowledge within the main and thematic goals but use the knowledge to treat some relevant problems.

The thematic goals describe the knowledge you are supposed to obtain through the course. You should use the parts of this knowledge that are relevant for the problems you treat. It is emphasized that an important part of the task is to identify relevant topics in relation to the task and those course goals.

The following parts should be included in the report:

1. Problem identification. Problems relevant for the situation and within the main and the thematic goals. If you choose to disregard relevant problems, this should be noticed and motivated. You can use the same problem formulations as your group came up with during the PBL meeting but you can also formulate your own.

2. Problem treatment. Solve the problems from an anatomical, physiological, and/or technical point of view.

3. Conclusion with reference to the situation.

4. Comments on the merits and deficits of your report. It is once again better to discuss the deficits than to try to hide them.

Submitting the report

The report should be sent to the examiner in PDF format to ingemar.fredriksson@liu.se. The whole report should be sent as a single pdf-file. It should also be sent to the system Urkund for controlling originality of the text, to: ingemar.fredriksson.liu@analys.urkund.se. The printed cover page with the signed declaration that the report is written individually (see above) shall also be handed in to the examiner. Leave it in the mailbox at floor 12 at IMT or send by post. On that cover page, also write date and time when the report was digitally sent in. The cover page in the pdf-file does not have to be signed. Reports handed in after deadline will not be graded.
Handling references
This text is translated from [http://www.imt.liu.se/edu/report/index.html#5_Referensteknik](http://www.imt.liu.se/edu/report/index.html#5_Referensteknik).
The list of references to other sources (books, articles, internet sources etc) is normally placed in the end of the report, before any appendices. Various formats of the reference notation in the text and of the reference list exist. According to the Oxford system, the references are sorted according to their appearance in the text, and the reference is given as a number within brackets [1, 2] or as superscript1,2. According to the Harvard system the references are sorted alphabetically and the reference is given in the text with last name and year of publication (Brown 1996). If one want to have the references more integrated in the text, they can be written according to the following examples:

<table>
<thead>
<tr>
<th>Reference style</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>According to Anderson (1996), the...</td>
<td>The Harvard system</td>
</tr>
<tr>
<td>According to Brown (1996a), the...</td>
<td>More than one from Brown the same year</td>
</tr>
<tr>
<td>According to Anderson [2], the...</td>
<td>The Oxford system</td>
</tr>
<tr>
<td>According to Anderson and Brown (1996), the...</td>
<td>Two authors</td>
</tr>
<tr>
<td>According to Anderson et. al. (1996), the...</td>
<td>More than two authors</td>
</tr>
<tr>
<td>According to Anderson [AND96], the...</td>
<td>Variant of the Harvard system</td>
</tr>
</tbody>
</table>

The reference list should contain the following fields:
- for articles:
  - Name of the author(s), full title, name of the journal, publication year, volume (issue) and pages
- for books:
  - Name of the authors(s) and editor(s) if not the same, full title (title of book and, if applicable, chapter), publisher, city, year, and ISBN-number
- for internet sources:
  - Name of the authors(s), full title, year of publication or access date, and URL

Example of the reference list with various formats: