REPORT WRITING

1. One of the most important aspects of working on a project is to present the work done in a proper report. A report is written to convey some ideas to the others. The others could be a plant manager, who is not an engineer, or be your superiors of the same profession, or be some technicians. You have to keep in mind that, no matter how good your work is it will be a worthless junk if you cannot transmit it to the reader.

2. A report should be clearly and intelligibly written, and should not need your presence by the report for further explanation to the reader about your considerations during the preparation of this report. You must therefore be able to express yourself to the readers by clearly stating your goals, your approach, your work and your interpretation of the results.

3. A good report starts by thinking before writing. Here are some tips for writing good reports:
   a. Spend time to think and to write the report.
   b. Decide on the contents to be presented in the report according to the profession of your reader, who can be nontechnical, technical-but not in your field, and technical-but in your field. Simply ask yourself "What does my supervisor need to understand and to evaluate my work?".
   c. Organize the contents in your mind sufficiently well to be meaningful. Good reports are composed of several subsections each serving for different purposes.
   d. Read what you have written after finishing each section and criticize it as an outsider to see if it is clear and easily understandable. Be positive in your statements.
   e. Read the whole report when all the sections are completed to check if the report is fluent enough to be followed, and if it contains all the information, views, and ideas meant to be conveyed to the reader.

4. Your report must include an abstract, introduction, experimental (or mathematical) methods, results and discussion (which can be written together or separately), conclusion, literature citations, nomenclature and appendices. The body of your report is expected to be between 10 and 15 pages, but important appendices can be included. Use fonts greater than 10 points and 1½ lines or double lines spacing.

5. All reports must be prepared with a word processor. Computers with word processing programs are available in the Chemical Engineering computer laboratories. Sample calculations, however, may be hand-written and attached to the report.
The following table shows the minimum requirements of a report, so that you can evaluate your report by yourselves.

<table>
<thead>
<tr>
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<th><strong>DO’s</strong></th>
<th><strong>DON’T’s</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TITLE PAGE</strong></td>
<td>Title page should include</td>
<td>Title of the report should not include unnecessary words, abbreviations and jargon.</td>
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<td></td>
<td>• a short title that describe the work and the contents of the report clearly.</td>
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<td></td>
<td>• the group’s, leader’s and member’s names (who participated in the experiment)</td>
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<td>• the date of the experiment</td>
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<td>• the date the report is submitted.</td>
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<td>• the name of the instructor.</td>
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<tr>
<td><strong>ABSTRACT</strong></td>
<td>Abstract should be planned for your reader, thus, he can decide whether reading the report (work) is significant for him. An abstract is therefore in many ways the most important (and equally the most difficult part to write) part of a report. Abstract should:</td>
<td>• Do not exceed 200 words (approximately ½ page)</td>
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<td>• be complete in itself, and written clearly.</td>
<td>• Do not put figures, tables, references</td>
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<td></td>
<td>• appear on a separate page.</td>
<td>• Do not put information not available in the report.</td>
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<td></td>
<td>• state main objectives</td>
<td>• Do not divide abstract into sections by subheadings</td>
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<td></td>
<td>• describe the experimental methods and equipment briefly.</td>
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<td>• state the major results both qualitatively and quantitatively (with proper units when applicable).</td>
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<td>• state the main conclusions.</td>
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<tr>
<td><strong>TABLE OF CONTENTS</strong></td>
<td>provides page locations of major sections (except the abstract) and lists tables and figures with page locations. It follows the abstract.</td>
<td>• Do not define symbols in the text of the report.</td>
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<tr>
<td><strong>NOMENCLATURE</strong></td>
<td>• lists all the symbols used in the report in alphabetical order with the units.</td>
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<td>• Roman and Greek letters should be listed separately.</td>
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<td><strong>INTRODUCTION</strong></td>
<td>should</td>
<td>Introduction should not be longer than 2 pages.</td>
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<td>• be written with your own words.</td>
<td>Introduction should not be a simple reproduction of the knowledge in books, papers etc., so you must avoid copying some texts (book, paper, internet, report of present and past students) directly.</td>
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<tr>
<td></td>
<td>• describe the problem.</td>
<td>Any reproduction will be considered as cheating and will be subject to a penalty (see Policies and Procedures)</td>
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<td></td>
<td>• describe your objectives.</td>
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<td></td>
<td>• state experimental methods in a general sense.</td>
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<td>• provide the reader with Relevant background information within the context of the experiment. This section should be brief, because it is usually not necessary to provide extensive information to the reader of a laboratory report.</td>
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<td>• reflect your understanding about information pertaining to the experiment</td>
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**EXPERIMENTAL METHODS**

The objective of this section should be

- presenting enough information so that your data in the results section can be easily understood.
- providing enough information that other engineers (or engineering students) who are moderately familiar with the experiment can repeat your experiment.

Experimental methods should:

- describe the materials, subjects, equipment used in the experiment.
- include a schematic drawing of the set-up. Draw your own figure.
- present important technical specifications, critical measurement parameters; essential dimensions of the apparatus (if applicable shown on the figure also), amount of chemicals used, etc.
- explain all steps you followed in the experiment.

**RESULTS**

- This section presents the results of your experiment and calculations in a comprehensible form. You must organize your results in a logical order and narrate them, thus one is linked to the others.
- Describe briefly the experimental conditions, range of parameters etc. (but not as detailed as in the Experimental methods section) before each table/figure, you should answer the questions like: what was done?
- Describe the content of tables and figures, and include an interpretation of your results, you should answer the questions like: what is that figure/table about?, what does it show?, what information can reader get from that figure/table? and what point should reader notice?
- Refer to tables and figures in the body of the text.
- Put appropriate literature information (data) for later comparison in discussion section.
- Report the results from most important to least, and simple to complex.
- Provide an outline of all calculations that you make. This does not have to be lengthy, but it should be enough thus the reader can follow what was done.

**Experimental methods**

- **should not** be merely a reproduction of the procedure as present in the lab sheets.
- **should not** include the results
- **should not** include the methods that you have not applied.
- **should not** be longer than 1 or 2 pages (+ figures)
- **should not** describe the part of an experiment which can be assumed by any engineer (or person); For example, you should not write "Before beginning the experiment, turn the lights of the room on..."
Intermediate steps may be omitted in the Results section but these should be presented in the Appendix.
- List all assumptions that you make in the calculations
- Report data error bounds, when applicable, in order to demonstrate the precision of results.
- A copy of the original raw data and calculations made to arrive at these results should be presented in Appendix.
- Watch out using the same kind of units through the Report.

**TABLES AND FIGURES**
- Each table and figure must be numbered, and have a short descriptive title (a caption). Do not use lazy titles such as “temperature vs. time.”
- Decide how much information should be on one graph. For example, do not prepare three separate graphs if you can draw three lines on a single graph. This permits trends to be noticed. When more than one curve is presented on the same graph then they must be properly differentiated by a suitable legend.
- Oppositely, do not put too much, or unrelated, data on one graph. This makes your graph confusing.
- Smooth curves must be drawn through data points in such a way that they conform with the pertinent theory reasonably (i.e., a curve of y versus x, drawn smoothly through data points, would be wrong if the theoretical relationship is linear). Lack of experience in using computers for plotting data should not be an excuse to present unrealistic graphs; in which case hand-drawings must be preferred.
- The symbols used must be the same as those used in the text.

**DISCUSSION** section is an evaluation of your results and an assessment of how well objectives (given in Introduction) were met.
You are expected
- to discuss the experimental conditions with the assumptions involved in the theory used in calculations.
- to evaluate your experimental results.
- to compare your results with theory and literature results.
- to give evidence for each conclusion by referring to the appropriate

- “Discussion” section should not be longer than 2 pages.
- Do not report the results again, but rather interpret and discuss their significance.
- Do not only write your excuses, possible errors as discussion,
- Do not overgeneralize.
- Avoid speculation that cannot be tested in the near future.
- Do not ignore the major issue (Did the study achieve its objectives?)
- figure/table in the “Results” section.
- to discuss possible reasons for expected and unexpected findings.
- to put a brief discussion on the possible experimental errors.
- to do realistic evaluation of reliability and precision of results.
- to use hard, quantitative statements.
- to use positive statements of what results mean.

If the discussion of your first result is required to understand your second result, you may combine “Results” and “Discussion” sections. If it is useful to discuss the results as a whole after all results are reported, you should write these sections separately.

**CONCLUSIONS**

- This section repeats the conclusions (what you have decided from your work) that are extracted from “Results and Discussion” sections.
- The "Results and Discussion" section discusses the results individually, the "Conclusion" section, however, states the results considering the whole experiment. The objectives stated in the "Introduction" are often examined to find out whether the experiment is successful or not.

**RECOMMENDATIONS**

- This section is not compulsory
- This section should include any feasible recommendation by the group regarding the equipment to perform a more precise and meaningful experiment, the range of experimental parameters, the minimization of errors, the development of measurement techniques, etc.

**REFERENCES**

- All references to books and articles cited in the text are listed in this section.
- Every listed reference must be cited in the text of the report by author and year (for example, Bird et al., 1960). There is no universal format for references, so you may use the format given in the following examples:

  For books:

  For papers:
  Winslow, F.H., Matreyek, W., “Pyrolysis of
APPENDICES

Anything considered as important for inclusion in the report, but which otherwise would spoil the fluency of the main body when present, should be given in this section. This part of the report can be handwritten.

Appendices should include

- all detailed calculations beginning with raw data should be included in appendices. In case of repetitive calculations, a complete and detailed set of sample calculation is sufficient, followed by a properly and understandably prepared table to show the results.
- include any additional calculations for calibrations and calibration curves (if any), data obtained from references (e.g., equilibrium data).
- include a copy of the original data sheet signed by the supervisor.