(Revised since 2010-11)

GUIDELINES FOR REPORT WRITING

B.Tech. and M.Tech.

Project Report, Dissertation & Seminar Report

GOVT. COLLEGE OF ENGINEERING
AMRAVATI 444 604

Contents

GUIDELINES FOR REPORT WRITING
(B.Tech./ M.Tech.)

This document may be referred as report writing guide. It may be used for the preparation of *seminar* and *project* reports associated with B.Tech./ M.Tech. programs. Some material in this document may be of use in the preparation of any technical report.

1. Explanation of terms used

1.1. Title Page: It is a first page of report. Try to find a title that clearly describes the work you have done and be as precise as possible. Mention your name, guide's (and co-guide's) name, name of the department (i.e. Civil Engineering), name of the institute, place and month and year of the report.

1.2. Abstract: Summarize the main points of the report on a separate page. Persons interested in the report after reading the title should be able to judge from the abstract whether the report is really interesting for them. So, **briefly formulate the problem that has been investigated, the solutions derived, the results that have been achieved, and your conclusions**. The abstract should not occupy more than one page (about 150 to 200 words). It must contain the context/ relevance of the problem at hand, a description of what was done and a gist of the significant observations/ results. **This page should precede the content page**.

1.3. Sequence of Contents: The material should be placed and bound in following order:

i) Preliminaries
- Top Sheet of transparent plastic
- Title page
- Certificate
- Declaration
- Acknowledgement
- Abstract
- Table of Contents
- List of Figures
- List of Tables
- Nomenclature

ii) Text of report Chapters (Main material)
iii) References
iv) Appendices

1.4. Table of Contents (TOC): Should list items in the following order.
- Certificate (before TOC)
- Acknowledgement (before TOC) Remember that acknowledgements are given only in the final report i.e. not in I and II phase reports, but in the final B. Tech./ M. Tech. project/ dissertation report.
- List of figures (1.1, 1.2, 1.3.., 2.1, 2.2, .. etc.)
- List of tables (1.1, 1.2, 1.3.., 2.1, 2.2, .. etc.)
- Nomenclature: necessary whenever symbols are used. This is in order of English (i.e. Roman) letters (Uppercase followed by lowercase), Symbols in Greek letters (see

Appendix for the alphabetical order of Greek letters), subscripts and superscripts used, Special Symbols, followed by acronyms (i.e., Abbreviations) if any; everything in alphabetical order. All entries in nomenclature should have appropriate units in SI system.
- The chapters (1, 2, … N, followed by the name of the chapter),
- Sections within chapters (e.g. 1.1, 2.4, etc. + name)
- Subsections within sections (e.g. 1.1.1 + name)
- Appendices (I, II, III, IV, .. etc. + name), if any
- References

Do not include the abstract and the table of contents itself in the table of contents. Every page of the report other than the title page and abstract should be numbered. Pages of Certificate, Acknowledgement, Table of Contents, Nomenclature, List of Tables and List of Figures should be numbered with lower case Roman numerals (i, ii, iii, iv, …etc.). From the first page of the first chapter onwards, all the pages should be numbered using Hindu-Arabic numerals (1, 2, 3, … etc.). The page numbers should appear at the bottom center.

1.5. The Chapters: The number of chapters you need and their contents strongly depend on the topic selected and the subject matter to be presented. Roughly the following chapters may be included. However, it is your own report and you have to structure it according to the flow of overall logic and organization.

1. Introduction: In this chapter you formulate the problem that you want to address, the statement of a problem and its relevance, the initial goals you had, etc. without going into details. Here you also describe the structure of the rest of your report, indicating which chapter will address which issue.

2. Literature Survey: It should be as exhaustive as possible but related to your work. The discussion on the literature may be organized under a separate heading & titled suitably. Summarize the literature that you have read. Rather than literally copying the texts that you have read, you should present your own interpretation of the theory. This will help you in developing your own thinking discipline and technical language. The last part of this section must contain a brief mention of the gaps in the literature and a justification for undertaking your study/project.

3. Theory-Oriented Chapters: The basic theory necessary to formulate the subject matter may be presented under a separate chapter & titled suitably.

4. Practice-Oriented Chapters: Depending on the work that you have done, it might be important to write about the system specifications, practical details, system behaviour and characteristics and cross links of the selected topic.

5. Conclusions: This is one of the most important chapters and should be carefully written. Here you evaluate your study, state which of the initial goals was reached and which not, mention the strong and weak points of your work, etc. You may point out the issues recommended for future research. State these clearly, in point-wise form if necessary, with respect to the original objective. Do not disguise "descriptions" of specific aspects, covered in the work as conclusions.

- Each chapter, section, subsection, etc. should have a title. An identical entry should exist in the TOC. Each chapter is numbered using Hindu-Arabic numerals: 1, 2, 3, .. The chapters may be structured in to sections and subsections. Sections within a chapter are numbered using a two-level scheme, (chapter no).(section no); for example, sections in chapter 3 are numbered 3.1, 3.2, ... Subsections within a section are numbered using a three-level scheme, (chapter no).(section no).(subsection no); for example, subsections in chapter 3, section 2 are numbered 3.2.1, 3.2.2, ... The sections and sub-sections must carry titles. Use different fonts for section titles and sub-section titles. For e.g. TNR-12-Bold capital for sections and TNR-12-Bold sentence case for subsections.
- Presentation of your contributions should include formulation, derivations, description of experimental set-up, experimental data/measurements, design calculations etc. For an experimental investigation, raw data must be available (preferably in an appendix). For a project involving software development, user's manual, programmer's manual, source code diskette/listing must be available. **User's and programmer's manuals are considered to be separate documents, distinct from your report and are therefore not included within the specified page limits.** As mentioned previously, these could form appendices.
- Do not be too general. Avoid writing essays on historical developments.
- Results/ Discussion/ Comments: If there are too many aspects to be covered then organize them in a logical manner.

1.6. Equations. Each equation should be numbered using a two-level scheme, (chapter no).(eq no). While typing, the equations should be centrally placed while equation numbers should be flush right. (LaTeX does this by default.) This number (e.g. 2.4, with 2 as chapter number and 4 as equation number) should be used (as Eqn. 2.4) whenever the equation is referred in the text. The equations should be clearly written. Symbols used in the equations should be explained immediately after the equation when they are referred first as well as in the nomenclature. SI units must be used through out the report. Present equations in dimensionless form, wherever possible and appropriate.

1.7. Acronyms. Avoid acronyms (short forms) in the report except the following standard ones. Equation(s): Eq(s), Figure(s): Fig(s). The words 'Table' and 'Chapter' are not shortened. If any other acronyms have to be used, list them separately at the beginning (after nomenclature). Mention the acronym in the brackets following its full form, whenever it occurs first. **The first word in a sentence is never a short form.**

1.8. Tables and figures. Tables and figures should be numbered and captioned. Each table or figure should be numbered using a two-level scheme, (chapter no).(table no) or (chapter no).(figure no). This number (e.g. Table 4.8, or Fig. 3.7) should be used whenever the table/ figure are referred in the text. Each table/ figure should have a title. An identical entry should exist in List of Tables or List of Figures respectively. **Title of a table is given at the top of the table following its number. Title of a figure is given at the bottom of the figure** following its number. Figures and tables should appear as close as possible to their first occurrence/mention in the running text of the chapter these belong to; these must appear **after** the first mention and not before. Photocopied tables should not be included. Photocopied figures should be avoided as far as possible and if included they should be large enough and clear. If taken from any reference, the reference should be cited within the text as well as at the caption of the figure or table.

1.9. References. Each entry in the reference has a label. All references cited in the text-body should be there in the Reference list and vice versa. Established acronyms may be used. E.g. AC, DC, ASME, ASTM, IIT, Jnl, etc., provided there is no likelihood of any confusion.

Labeling: One of the following systems can be used for labeling the cited entries.

System 1: A numeric label arranged in an order of citation in the main text. This label is used in square brackets or as superscript at the point of citation, e.g. [34]. The references should be arranged together in the order of this numeric label.

System 2: A label derived from the authors name and the year of publication. For entries with 2 authors, include the surnames of both the authors followed by the year of publication. For entries with multiple authors, include the surnames of the first author followed by 'et al.' and the year of publication. This label is used in round brackets at the point of citation, e.g. (Taylor, 1982) or (Taylor et al., 1982) or (Taylor and Morgan, 1982). The references should be arranged together in the alphabetical order of the author surname (1st priority) and the year of publication (2nd priority).

The reference list thus compiled together should be included after the main text but before Appendices. In the reference list, you should provide the details of each entry in the following manner. These details differ depending on the type of bibliographic entry.

- For a book: name of the authors, *title*, publisher, city of publication and year of publication. (Taylor J. R., *An Introduction to Error Analysis*, Oxford University Press, Mill Valley, CA, USA, 1982)
- For an article in a journal: name of the authors, title, *name of the journal*, **volume** (issue number), range of pages, and year. (Bandyopadhyay S., Bera N.C. and Bhattacharyya S., 'Thermoeconomic Optimization of Combined Cycle Power Plants', *Energy Conver. Mgmt.*, **42**(3), 359-371, 2001.)
- For an article in conference proceedings: name of the authors, title, *name of conference*, editors (if present), range of pages and year. (Kedare S.B. 'Optics, Design, Performance and Economics of the Dynamic Fresnel Paraboloid Reflector Concentrator Dish with Point Focus for High Temperature Solar Thermal Applications', *Proceedings of National Renewable Energy Convention '99*, Sawhney R.L. (Ed.), 9-15, 1999.)
- A chapter in a book: authors of the chapter, title of the chapter, editors of the book, *title of the book*, publisher, city of publication, range of pages, and year of publication.(Bilgen E., Industrial Solar Power Stations, Veziroglu T.N. (Ed.), *Solar Energy and Conservation: Technology, Commercialization, Utilization*, Volume2, Pergamon Press, NY, USA, 665-673, 1978)
- A report: authors, *title*, university/company, report number, year. (Ahmed K., *Renewable Energy Technologies*, World Bank Technical Paper Number 240, 1994)
- A Ph.D. or Masters Thesis: author, *title*, department, university, year. (Kedare S.B., *'Investigations on a Reciprocating Wind Machine'*, Ph.D. Thesis, Dept. of Mechanical Engineering, IIT, Mumbai, 1991)
- A manual / handbook / standards : company name (if there are no authors), *title*, reference number, year. (British Standards Institution, *Specification for Steel girder bridges*, BS153 : Parts 3B & 4 : 1972, 1972)
- A web-site : Author or Organization, *name of the site*, complete address of the site, date visited (Danish Wind Industry Association, *Aerodynamics of Wind Turbines: Lift*, http://www.windpower.org /tour/wtrb/lift.htm, Aug 16, 2002)

Bibliography: In a few exceptional cases, it is useful to suggest a list of publications for background reading. These are not cited anywhere in the text. This list can be included as 'Bibliography'. It should follow 'References' on a fresh page.

1.10. The Appendices. Appendices are useful for those things that you consider important, but that do not fit in the main presentation of your work and breaks the regular flow. There could be several reasons for using appendices: the material is too long and has too many details (e.g. the specifications of instruments or equipment), you have formulated a theorem, the proof of which is too long for the main text, you want to include a user manual for the software that you have come across (strongly recommended!), you want to present the schematics of a hardware design, experimental set-up, etc. Appendices tend to occupy many pages. Think carefully on what you want to include. For example, complete listings of the source code that you have written are seldom interesting. Instead, add a flow chart. Avoid describing the test set-up where a schematic can be easily used. Appendices are numbered as Appendix I, Appendix II, etc. or using capital English letters e.g. Appendix A, Appendix B, etc. If you have just one appendix, then it is not numbered.
Alphabetical order of Greek letters: Alpha, beta, gamma, delta, epsilon, zeta, eta, theta, iota, kappa, lambda, mu, nu, xi, omicron, pi, rho, sigma, tau, upsilon, phi, chi, psi, omega.

2.0 ADDITIONAL GUIDELINES FOR SEMINAR/ PROJECT REPORTS

2.1. INTERACTION WITH YOUR GUIDE

It is recommended that you meet your guide regularly during the course of the seminar/project, though ultimately the form of this interaction depends on both of you. You should maintain a record notebook/file where you can include a record of your discussions with your guide, literature survey details, derivations etc. Such a system will allow easy and quick access to the details and chronology of your work. **The final responsibility for producing an error-free report lies with you, and not your guide.**

2.2. SUBMISSION

Number of copies to be submitted is no. of student + guide + library +department + No of examiners. The bound copies (**Black colour for B.Tech., Maroon for M.Tech**.) of your report should be submitted within the given deadline. Late submission may not be acceptable. **Make sure that the certificate in your report is signed by concerned authorities before you make the final submission of the report.**

2.3. FORMAT

2.3.1 TEXT AND UNITS **It is mandatory to use plain A4 sized good photocopying paper sheets, 70 to 90 gsm (16 to 20 pounds), smooth finish**. All material should be typed in double spacing using times new roman. The recommended margins are 25 *mm* (1 inch) for top, bottom, right and left with an *extra* 13 *mm* (0.5 inch) for binding on the left. Other than page numbers, no material should intrude into these margins. The SI system of units should be used as far as possible.

2.3.2 PAGE LIMITS Avoid writing a report which is artificially fattened. Do not waste pages. Use space optimally.

2.3.3 Format for TOP COVER Hardbound reports should have the following printed/ embossed on the cover: Also the same is to be repeated as first page within.

PROCESS CONTROL OF AEROBIC FERMENTERS

M. TECH./ B,TECH.DISSERTATION/PROJECT

Submitted to Sant Gadge Baba Amravati University, Amravati in Partial Fulfillment of the Requirements for the Degree of BACHELOR/ MASTER OF TECHNOLOGY in MECHANICAL ENGINEERING.

By
VINAY RAMACHANDRAN
(ID 78002045)

Guide
Dr. R P Sharma
Professor

College Logo

DEPARTMENT OF MECHANICAL ENGINEERING
GOVT. COLLEGE OF ENGINEERING
AMRAVATI 444 604

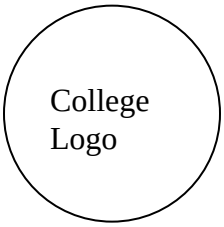
NOVEMBER 2008

2.3.4 Certification page –

GOVT. COLLEGE OF ENGINEERING AMRAVATI 444 604

DEPARTMENT OF MECHANICAL ENGINEERING

CERTIFICATE



This is to certify that the project/ dissertation entitled, "PROCESS CONTROL OF AEROBIC FERMENTERS', which is being submitted herewith for the award of B.Tech./ M.Tech., is the result of the work completed by VINAY RAMACHANDRAN under my supervision and guidance within the four walls of the institute and the same has not been submitted elsewhere for the award of any degree.

(Dr. R P Sharma)
Guide

Examiner

(Name)
Head

(Name)
Principal

2.3.5 Declaration page

DECLARATION

I hereby declare that the project/ dissertation entitled, “PROCESS CONTROL OF AEROBIC FERMENTERS’ was carried out and written by me/ us under the guidance of Prof. R P Sharma, Professor, Department of Mechanical Engineering, Govt. College of Engineering, Amravati. This work has not been previously formed the basis for the award of any degree or diploma or certificate nor has been submitted elsewhere for the award of any degree or diploma.

Place: VINAY RAMACHANDRAN
Date: (ID 78002045)

2.3.6 Acknowledgement - please keep this brief and resist the temptation of writing flowery prose. Do include all those who helped you, e.g. other faculty / staff you consulted, colleagues who assisted etc.

2.3.7 ToC

CONTENTS

2.3.8 List of Figures - sample entries are given below. Repetitions in the titles of figures and tables be strictly avoided.

List of Figures

2.3.9 List of Tables

List of Tables

2.3.10 Nomenclature - All symbols that appear in the report should be listed alphabetically. First give all roman symbols, then Greek symbols. Order: ASCII ordering, to the extent possible. Subscripts and superscripts should be listed separately if these are not an intrinsic part of the variable name.

2.4 MAIN PAGES

Each chapter should commence with a chapter number (12 TNR Bold Sentence) and title (14 TNR Capital Bold). The text should begin on the same page with 3 blank lines between the last line of the chapter title and the first line of your text material. Keep 1 blank line between the chapter number and the title. Adjust the chapter number and the title to fall in the center of the page and use bold, upper case fonts. All pages, including figures and tables, should be numbered. Use TNR 12 font for writing the text.

Figures and tables should be complete in all respects (legends, number, caption/title, reference (if any), coordinate labels with units). Experimental data should typically be represented by centered symbols, while theoretical data by continuous curves in figures. Photographs should be treated as being equivalent to figures, with the caption being placed at the bottom of the photograph.

When displaying computer code listings (usually in an appendix) please ensure that these contain appropriate comment statements so that the code can be understood easily. It is always desirable to have a high degree of similarity between the variables names / symbols that you have used in the report and those which appear in the code (e.g. *D* and RHO etc.)

2.5 GENERAL GUIDELINES

Please maintain consistent tense in your report. Do not keep flipping between past and present tense. It has been the norm to use the passive voice ("was done") in technical writing. Pay attention to detail and accuracy. Be clear, but concise.

Please make a sincere effort to weed out typographical errors. Remember that these mistakes will cost you marks and may even earn you a re-submission. If you have become tired of reading your report over and over again and suspect that this fatigue will cause you to overlook typos and grammatical mistakes get a friend to help you out (perhaps you can also provide similar help in reciprocation).

3. EXPECTATIONS FROM WORK

i. Literature survey of related work with a clear identification of gaps in the literature and the justification and desirability of undertaking the study.
ii. Theory / model equations including method of solution. This section may also contain a detailed rebuttal of some previous study.
iii. Experiment / design of experiments, description of equipment and materials, methods of analysis. This section may include a critique of some previous experimental work
iv. Salient observations on the results you have obtained such as the relationships between different variables and parameters, unusual trends, interpretations of the observed trends, comparison between theory and experiment, comparison with previous literature, limitations, justification of prior assumptions made, and inconsistencies.
v. Summary of salient observations and trends, how the study filled some gaps in the literature, scope and desirability of further work on the problem, applications, potential areas