Student Project Guide

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Note: This Student Project Guide has been approved by the Engineering Faculty’s Academic Commission, as indicated in ACO 32/2001 (April 9, 2009); all right reserved to the author.
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1. Introduction

Virtually, all quality characteristics are complete and up to requirements in a teaching-learning process, but if it lacks quality of communication, quality assurance cannot be guaranteed since the former functionalities are largely dependent on the latter; perhaps, this sounds pertinent to our faculty. During the five years of stay at the faculty, our engineering students’ appear to acquire satisfactory knowledge and skills in the field of engineering ultimately to apply in problem solving and innovation in a respective field. Our students’ relatively better performance on job placement tests and attempt to apply their knowledge as demonstrated in the course of ongoing experiments at the time of training are more or less positive indicators. Despite of adequacy in the subject matters, their competency is hindered by poor communication and non-standard writing format as illustrated in their final year project papers. The author had assessed 38 project papers compiled by the 2008 graduates from the departments of IE, ME, EE and CE. The common problems observed in the project papers are as follows:

1. Irrelevant problem statement.
2. Inability to compose abstract statement.
3. Vague procedural statements/instructions in some cases.
4. Unfamiliarity with text citation.
5. Unfamiliarity with any type of standard bibliography or reference listing.
8. In some cases, inability to prepare an introductory section/chapter, for instance, what is design about, lack of descriptions regard to multipurpose structural designs they are pursuing, and failure to use applicable technology like, CAD/ auto CAD or alternative templates for drawing and computations.

These and other deficiencies in the project paper ultimately undermine the reliability of the work and content of a given project paper, due to unfamiliarity with a research methodology, design procedure, improper organization and communication. In the long run, chronic deficiencies in this aspect can lower a respective trainee’s self-esteem that may cause an avoidance lifestyle in the similar activity just to mask up unlearned skills.

Usually, engineering student project papers contain literature review on selected topics, design processes, equations, figures, procedures for problem identification, and sequential instructions for applied engineering and technology, as well as, probable solutions to problem(s). As procedural and manual documents, communicability and clarity of the material is essential to be used for intended purposes.

The aim of present guideline is intended to provide technical support, specifically for the final year engineering students how to organize and compile their project papers in an acceptable writing standard clearly and accurately for successful completion of the project and ultimately equip them with necessary skills for more effectiveness in the engineering profession. The problems described above and other basic project writing components, project task descriptions
and advisor-jury marking criteria are addressed in this document for use. The writing format discussed here is consistent with American Psych Association (APA) publication. It is preferred by the author because of its adaptation by the university and wide popularity in research and academic literature for references. Its software template is also currently on sales.

To provide unlimited access to the students, the document is composed on word-processor, as well as, hyper text mark language (html). Writing on the MS-word processor is more convenient for document availability in a hard copy. The html on the other hand is suitable to place information on a web site for economical and unlimited access. The icons with html document is usually appeared with an $e$ symbol, unlike a MS-word document symbolized with $W$. 
2. Project Title and Cover Page

Any project paper shall have a title and cover page. The title should be specific, descriptive to the content of the whole work and the first letters of the words in capital case, except adverbs, articles and propositions (such as and, the, of, etc). The cover page shall display title, intended fulfillment, authors (project assignees’ names), advisor’s name, the name of the institution and date. The title, authors’ identities and institution should be at the top; the university’s logo in the middle, and the advisor’s name, partial fulfillment and date need to be indicated at the bottom of the page. The whole cover page should be double spaced, scaled the title part on 36 font size and the rest of the characters on the same page should be set with 14 time roman fonts. Notice that the title page model is not necessarily consistent with the APA format, but organizing this way is necessary to glance at a respective advisor’s name easily and avoid the title confusion with the name of the institution. Please find example from the next page.
Sample title page format:

Project Study for Establishment of Community Information Center at Kosober

Badilu Banda
Behailu Mulusewa
Bereket Dejene
Bahir Dar University, Engineering Faculty
Industrial Engineering Department

Final year project report submitted in partial fulfillment of the requirements for
the award of Bachelor of Science in Industrial Engineering

Advisor: Tesema Belai, Assi. Prof

June 2008
2.1 Running Head

The running head is a full title or portion of the title appeared on the page margin. If the title is short, the running head can be the full title; otherwise, the portion of it is embedded in the header or footer to create the running head with page numbers, for example, the running head of this document is “Project Guide” (find more examples in Table-1). In a long manuscript or a published book, the running head can vary from one chapter to another depending on a format of publisher.

Table-1: Running head examples

<table>
<thead>
<tr>
<th>NO</th>
<th>Project Title</th>
<th>Running Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Establishment of Community Information Center at Kosober</td>
<td>Information Center at Kosober</td>
</tr>
<tr>
<td>2</td>
<td>Advantages of JAVA Script over PHP Language: Research Review and Practical Experience</td>
<td>Advantages of JAVA Script over PHP</td>
</tr>
<tr>
<td>3</td>
<td>Quality Characteristics of Corolla Shaft</td>
<td>Quality Characteristics of Corolla Shaft</td>
</tr>
</tbody>
</table>

3. Bonafide Certificate

In the APA format, the bonafide certification statement is not required unless revised lately, however; comments forwarded from staff, especially from Mechanical Engineering Department who read the draft document favored inclusion of the bonafide certification statement. As one of unnamed commenters put it, the bonafide certificate statement can be declared on a separate page, next to the title page as follows:

**Bonafide Certificate**

Certify that this project report entitled Design of Dental Care Device Using Micro Abrasive Jet bonafide work of:

1. Tewodros Fisiha
2. Tewodros Kahsay
3. Yoseph Tesfaye

who carried out the thesis/project under my supervision. Certify further that to the best of my knowledge the work report herein does not form part of any other project report, or dissertation on the basis of which a degree or award was conferred on another occasion on this or any other candidate.

Advisor’s name and Signature: ____________________________ Date_____

Department Head’s Name and Signature: ____________________________ Date_____
4. Table of Contents

A table of contents is systematic indexing of document contents on a broader search. The table of contents is usually needed for literature more than 20 pages. Its purpose is to locate chapters, topics and subtopics, which have been covered in a given document. It contains page numbers for chapters, major headings, subheadings, list of figures, list tables and list of symbols or abbreviations. A well organized table of contents splits a major heading into sub-headings to keep flow of ideas in coherent and make the organization simple for readers. For example, if a major heading is “System Reliability”, it can be divided into further subheadings up to four or more levels, as follows:

4.1 System Reliability

- 4.1.1 Reliability and Size of Components
- 4.1.2 Reliability and Component Arrangement
  - 4.1.2.1 Series Arrangement
  - 4.1.2.2 Parallel Arrangement
  - 4.1.2.3 Combination
    - 4.1.2.3.1 Arrangement with Toggle Switches
    - 4.1.2.3.2 Arrangement with Rotary Switches
    - 4.1.2.3.3 Arrangement with Alternative Control

Remember, subheadings can be divided in use of serial numbers as indicated above or in combination of numbers and letters, or without either of them. In the APA format, numbering or bulletin is not required.

5. Research/Project Statement

One of important statements explained in research or a project proposal is a statement of project synopsis, commonly known as a problem statement or purpose/objective of a study. It is also included in the report paper, details are described below.

5.1 Statement of Problem

A problem statement is a brief description that gives a direction what to be assessed and determined. The problem statement can be categorized into two, as (1) qualitative statement, and (2) analytical statement. The qualitative statement is conceptual description, which is expressed in plain sentences or questions. The analytical statement on the other hand is defined in a traditional null hypothesis technique in combination with arithmetic symbols. The assessment of finding is acknowledged if a null hypothesis is tested and an alternative hypothesis rejected, otherwise it is accepted as no significant difference. Examples are illustrated below for both cases. Since under graduate students are not working on a thesis
rather a basic project, the problem statement is not required, except statement of the project objective(s). Among observed sample projects 90% of them have no problem statements. Remember, actually, the qualitative type of the problem statement is similar to the objective statement, unless it is formulated in the form of a question.

A) Example of the Qualitative Problem Statement:

**Story:** A company TM is a manufacturing firm, which involved in automobile transmission component (part) production. Every production is tested in its workshop with a standard fixed wheel machine before it is available to the market. An important testing input is chemical, which is known as transmission oil, supplied by a new overseas vendor. In recent weeks, its products 4 out of 10 are failed to pass the test. A team of investigators are proposing a project for the study. If the team wants to determine possible implication of the chemical change, the problem statement can be formulated in a simple sentence as:

**Sample Statement -1:** In the recent weeks, the company’s transmission components, 4 out of 10 have failed to pass the initial test. The current study is to determine likely correlation between the failure of transmission components and the new chemical currently in use for testing. In order to investigate possible links, the test to be conducted on the components utilizing diverse chemical brands in the company’s workshop for data analysis.

**Justification for the Sample-1:** It is clear and concise. Its variables are transmission component and chemical. The relations of these variables are empirically measurable. It has also specific population parameter, which is all transmission components produced in the same process. The statement summarizes also the actual problem what is happening (failure), intended purpose (determining the correlation) and the broad activity (tests) to be carried out to achieve the project plan. Detailed description is not needed regard to the test, because it will be specified in a methodology section. For that reason, the statement of the problem appears be complete.

*Or it can be composed in the form of question as follows:*

Is there correlation between transmission component failure and current chemical in use for testing?

**Sample Statement -2:** We will design an incubator to be used by nurses, doctors and/or technicians in under-equipped medical clinics in developing countries. The incubator will maintain samples at physiological temperatures (35° - 37° C) for at least 24 hours. It will have a capacity of at least 10 10-ml test-tubes or 3 100-mm petri dishes. The cost will be less than $200 (http://web.mit.edu/sp753/www/prob-def.html).

**Justification for Sample-2:** It is concise and measurable. The statement emphasizes factional characteristics of the product be developed, but it does not provide information on the background of the problem that has initiated the designed of the incubator, and the planned activities related to design development.
Sample Statement-3: The purpose of this project is to create four different WebQuests which employ constructive active learning pedagogy, teach higher order thinking skills and that introduce feminist issues to 6th to 8th grade art students. I will pilot the WebQuest over a period of 3 months and document student written responses, my observations of their process, and student learning and interest in the feminist technological art curriculum (Tiffanie Davis, 2000).

Justification for Sample-3: This problem statement expresses what is to be achieved, and activities that have been associated with the planned project. But, it does not say on the background of the problem. It seems there is no such important problem perceived by the investigator, but wants to see feminist behaviors among the specified grade students.

B) Example of the Analytical Problem Statement:

Story: A machine-A is checked frequently by a team of quality personnel whether it is producing a brake plate within the specification mean of 0.8 diameter inches. Because of customer requirements, if products of brake plates are larger or small than 0.8 diameter inches, the process is out of control and must be adjusted. Therefore, the null hypothesis ($H_0$) and alternative hypothesis ($H_a$) are formulated in Sample Statement-4 for testing based on the population ($\mu$/mean) parameter.

Sample Statement-4:

- $H_0$: $\mu = 0.8$ (i.e., the process is under control)
- $H_a$: $\mu \neq 0.8$ (i.e., the process is out of control)

Justification for Sample-4: The purpose of the test is to maintain specified quality and functional requirements of the product. For this kind of hypotheses, a test-type and probability value of significance are specified in the methodology section of a research/project paper, of course, the most common significant values are $p < 0.01$ & $p < 0.05$. However, usually, the natures of our students’ project works do not require the null hypothesis techniques.

5.2 Statement of Objective(s)

As you notice, complete qualitative problem statement embraces three components: the background of the problem, intended purpose and associated activities. The statement of objective(s) is similar to a portion of the purpose oriented statement. For example, the component of the problem statement above illustration can be the objective statement as follows:

Objective:
The current study is to determine possible correlation between failure of transmission components and current chemical in use for testing. The problem statement is more common in a proposal package and project document rather than the statement of the problem since formulation of objective is required in any project.
5.3 Limitation

Limitation is a scope of a project or a study to be addressed, for example, the above investigation is only limited to possible chemical effect on transmission component failure, and it is not interested to look into the roles of other variables, like dimensions, shortcomings related to an assessment methodology, lack of reliable data or transport limit, like that should not be the statement of the limitation.

6. Acknowledgement

You can acknowledge in your project paper those who played important roles for success and completion your project.

7. Abstract

A research finding is required to have an abstract statement. The abstract needs to consist of in brief, the nature of investigation, a number of samples, methodology, obtained result, author’s name and affiliation. The author’s name is needed if the abstract is sent or kept as a separate document. Many publishers require the abstract to be condensed in about 100 words. Do not include in the abstract mathematical formulas, the literature review part of your document, or other irrelevant components, which are not part of the finding.

The word “fining” is connoting to a result obtained after investigation in use of an acceptable research methodology; literature review is not finding, therefore there is no need to have the abstract. If you are working on a grant project or a fundraising project, or a visibility study, the abstract is not required, but an executive summary/project summary is expected for these sorts of documents.

8. Literature Review

Any investigator is required to conduct literature review that relevant to a selected topic. The literature review is not just coping and embedding someone’s work, but it is incorporating by rephrasing or quoting to support your position regard to the subject you working on. As an investigator, of course, you can learn a lot about subject matter, including strength and weakness of the previous assessments, as a result of the literature review. Paragraph or text citation format is demonstrated in section 24.1 how to cite others’ works. In some cases, the student’s project paper is just literature without a substantial work on an existing problem as planned in the project task assignment. For that reason, this guideline restricts the literature review section to 8-12 pages. The literature review is embedded in the section entitled Introduction immediately after abstract, for a grant writing project, a format is different and you need to refer another document. In some of students’ project paper the same section is entitled “Literature Review”, this labeling is non-standard and should not be practiced. If a student wants to organize the document into chapters, Introduction is to be Chapter-1.
9. Procedural Details

In most cases, the students’ project paper lacks procedural specificity and details. The students’ paper usually proposes possible solutions for identified problems, but lacks details and specificity in an implementation procedure. For example, it says old machines should be replaced with new up to date ones to improve productivity. This expression is vague, it doesn’t imply, its capacity compared to the old machines, brand, model and other functional characteristics, like automatic or manual. Lack of clarity in implementation procedure means the project paper has no user for a practical purpose except for graduation fulfillment. This kind practice does not have a role in capacity building, businesses, commerce and industries. Both advisors and advisees can pay more attention in this aspect our students’ efforts to be useful in a real world beyond intellectual consumption. The nature of academic papers differ from other kinds of literature are due to their procedural duplicability rather than factuality. Find the examples condensed from the author named Gafert (2004), which I named the e-mail account display name Hanna and the server name bdu.edu.et (actually DNS) whether this mail server exist in the real world or not, the aim is to demonstrate procedural specificity in the context of this section. Also, assume that SMTP and POP3 servers/protocols have been already configured and the e-mail account hanna has been created.

How to Set up and Configure the Email Server in Windows Server 2003 Using Outlook Express as E-mail Client condensed from (Gafvert (2004), for student procedural illustration purpose in the context discussed in this section.

- Start Outlook Express (any computer that is connected to the email server)
- Click Tools and then Accounts
- Click the Add button and select Mail

Table-2: Data for wizard. When a wizard starts, use the corresponding data from the right column to complete the wizard at left column:

<table>
<thead>
<tr>
<th>Data for wizard</th>
<th>Data for wizard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display name</td>
<td>Hanna</td>
</tr>
<tr>
<td>Your sever name</td>
<td>bdu.edu.et</td>
</tr>
<tr>
<td>E-mail address</td>
<td>hanna@&lt;your domain&gt; (<a href="mailto:hanna@bdu.edu.et">hanna@bdu.edu.et</a>)</td>
</tr>
<tr>
<td>Incoming mail server is</td>
<td>POP3</td>
</tr>
<tr>
<td>Incoming mail server</td>
<td>&lt;your domain&gt; (bdu.edu.et)</td>
</tr>
<tr>
<td>Outgoing mail server</td>
<td>&lt;your domain&gt; bdu.edu.et)</td>
</tr>
<tr>
<td>Account name</td>
<td>hanna@&lt;your domain&gt; (<a href="mailto:hanna@bdu.edu.et">hanna@bdu.edu.et</a>)</td>
</tr>
<tr>
<td>Password</td>
<td>hanna</td>
</tr>
<tr>
<td>Remember password</td>
<td>Checked</td>
</tr>
<tr>
<td>SPA</td>
<td>Unchecked</td>
</tr>
</tbody>
</table>
• Click **Tools**, then **Accounts**.

• Click **bdu.edu.et** and then the **Properties** button

• Click the **Servers** tab

• In the **Outgoing Mail Server** section enable **My server requires authentication**.

• Click **Apply**, click **OK**, click **Close**

• Create a new email, and send it

**SPA (Secure Password Authentication):**

• Click **Start**, then **Run**

• Type **p3server.msc**

• In the right pane, right click your computer’s name and click **Properties**

• Check the box **Require Secure Password Authentication...**

• Click **OK**

• You will be prompted to restart the **Microsoft POP3 Service**, click **Yes**

To Change Some Settings for the E-mail Clients:

• Start Outlook Express

• Click **Tools**, click **Accounts**

• Click the **Mail** tab, click the name of your email account, click **Properties**

• Click the **Servers** tab, and click **Log on using Secure Password Authentication**

• Change the account name from **hanna@<your domain>** to **hanna**

• Click **Apply**, click **OK**

The above setting procedure is presented in plain language, specific, clear, duplicable and testable whether the procedure is functional or not. If workable an operator with basic computer skills can execute without the writer’s technical support. In that case, the procedure is capable of solving the mail server and e-mail account setting problems in server window 2003, related to outlook express. Consequently, the setting procure is usable and consumable by its potential customers. If the procedure is erroneous subjected to a review, if faulty it may not entirely attract customers. Any procedure is expected be specific and clear testable or usable, and the same principle can be applicable to our students’ project papers’ in procedural or implementation sections, to add power for dealing with an actual reality.

### 10. Figures and Tables

Figures and tables should be consistent and elaborative to an issue discussed in the text. They need to be numbered in Arabic numeric, titled and labeled in coherent with the content, including vertical and horizontal axes if appropriate. In the APA format, the title is appeared at the top and its’ source at the bottom if it is somebody’s work or even yours, but a previous output. The figures and tables shall be self-explanatory a professional in the field to be able understand without further reading the text. *Except common ones as indicated below, the symbols and abbreviations related to the figure are usually defined.* Also, the reader needs to be informed in the text to find the figure or table (for example, like this, see Figure-24). If a
document contains considerable figures and tables in quantities, they can be numbered on the chapter basis, starting with a chapter number (for example, Table-3.9 which means Chapter 3, Table 9). Remember, you may have to secure permission to embed tables/figures into your document from a copyright owner.

![Figure-24: OC for double sampling plan](image)


### 11. Common Mistakes in Language Use

It is not exaggeration to say, whatever adequate knowledge and skills individuals have in a working language may determine their fates where environment is competent for job placement and promotion. A learning process is presumably dependent on language/symbols to transfer knowledge to a third party. Bearing that in mind, it may be fair to say, training is communication, or vice versa. Non-standard language/symbol use, eventually cloud the clarity of a message and create barrier between a sender and receiver. In our educational environment, the English language is the instruction medium, as a result, needs considerable attention and efforts to build the students proficiency in basic English. The author is neither an English teacher nor professional in the linguistic field, and has no duty to discuss details about it. Thus, this paper is limited to only the students’ common mistakes as have been observed in their project papers, to help them be able to produce quality consumable documents by their potential customers. The observed common mistakes and likely incurrence are addressed below illustrating appropriate examples.

#### 11.1 Names

**Standard Expressions:** Individual or organizational names start with a capital letter, example, Wrewoina Tesema, Davisa Asfa, Nashia Ahmed, Engineering Faculty, Bahir Dar University, etc.
Non-standard Expressions: *University, Faculty, Company* are non-standard use. These three of terms are general nouns they are not particular institutional name and consequently, there is need to capitalize the first letters.

**11.2 Titles and Headings**

Standard: The titles of the first letters should be capital, for example, Prime Minister Meles, President Bush, Ato Kebede, etc. are titles.

Headings of the first letters should be also written in capital, for example, in this section, item 11, “Common Mistakes in Language Use” is heading and the first letters are capitalized; however, you don’t have to capitalize articles, adverbs and propositions, for instance, “in” in same heading is written in small. Besides that, in section-9 above, the initial characters of the words like mail, account and outlook express are keyed in the capital case for being the subheadings in that particular context. Table of contents appeared in booklets are headings and require same standard, but figure or table captions are not usually considered as headings and no capitalization.

**11.3 Jargon**

Using engineering technical terms while communicating with ordinary audience (Davies, 1996), presumably, a textile engineer says, *60-count cotton* is needed to improve yarn quality, on a televised news conference. More often, engineers are blamed for jargon expressions. The author thinks the causes of jargan can be due to limitations of appropriate plain words for technical terms in local languages, speakers’ limitations in local languages, unconsciousness moth slips or might be used as indicators of educational statuses depending on a societal norm. An author has to take into account consumers of the literature, while preparing it otherwise will fail to communicate with target audience.

**11.4 Words with Hyphen**

Some words deserve hyphen between, for example, self-confidence, self-esteem, cross-sectional study, self-replication (e.g. in a network context), self-explanatory, etc. In contrary, some users split a single word into two, for example, “welcome” is one word and no need to split or hyphen it. The observed common mistakes are writing as “well come”, or “wel come”.

**11.5 Plural Forms Vulnerable to Errors**

Except the term amplitude, the words listed below are identified by Davies (1996), who illustrated their single-plural forms and traced originality to Greek or Latin for some of words, in effect considering the relevance of the terms in engineering communication. Any way, some of them are useful for any subject beyond an engineering field.
<table>
<thead>
<tr>
<th>Single Form</th>
<th>Plural Form</th>
<th>Commonly Used in</th>
</tr>
</thead>
<tbody>
<tr>
<td>data</td>
<td>data</td>
<td>any subject</td>
</tr>
<tr>
<td>criterion</td>
<td>criteria</td>
<td>any subject</td>
</tr>
<tr>
<td>formula</td>
<td>formulae</td>
<td>mathematics &amp; engineering</td>
</tr>
<tr>
<td>radius</td>
<td>radii</td>
<td>mathematics &amp; engineering</td>
</tr>
<tr>
<td>analysis</td>
<td>analyses</td>
<td>any subject</td>
</tr>
<tr>
<td>axis</td>
<td>axes</td>
<td>mathematics &amp; engineering</td>
</tr>
<tr>
<td>matrix</td>
<td>matrices</td>
<td>mathematics &amp; engineering</td>
</tr>
<tr>
<td>phenomenon</td>
<td>phenomena</td>
<td>psychology &amp; some events</td>
</tr>
<tr>
<td>appendix</td>
<td>appendices</td>
<td>any subject</td>
</tr>
<tr>
<td>amplitude</td>
<td>amplitudes</td>
<td>physics &amp; engineering</td>
</tr>
</tbody>
</table>

The term *data* plural form may create controversy. In an English language grammar rule, things can be categorized into two, countable and uncountable objects. The uncountable objects have no plural forms, for instance the word “information” has no plural form, I mean we don’t say “informations”. From a grammatical point of view similar argument may apply to the data. When I saw a number of authors’ expressions the term is used in both cases as plural and single forms, despite Davies (1996) who insists on the singular form. My consideration is on the basis diverse experiences rather than theoretical arguments. I recall, twenty years ago, when I was a third year college student, a research guideline given by the instructor named, Dr. Lyman, reads the data as plural and its single form *datum*. Also, *Oxford Dictionary: for the Business World* defines data, noun, plural, and states “…treated as a single although the singular form is strictly datum.” My argument is open and the students are encouraged to do further assessment in this regard.

11.6. Preferred Verb Tense for Citations

While citing a third party’s work that reflects the authors position on this particular issue, you need to use present tense if using the APA writing format unless there is modification in the latest edition. For example, it can be cited like this in the present tense, Chekol (2005) argues that flame in the engine is related to design defect not gasoline impurity. If you are citing just one time finding which does not necessarily reflect the author’s position in the subject, you can cite in past tense, for example, Chekol (2005) argued that flame in the engine was related to a design defect not gasoline impurity.

12. Method

In this section, various experimental tools, items and proceedings are clearly described heading by heading. The study materials and procedures differ from one discipline to another. For instance, in behavioral or medical science subjects, sample human participants are important components and consequently, the subheading called Subject is appeared under the main heading Method. But, that is not the case in the engineering discipline, most study
samples are finished goods/objects, production processes or systems, sequential instructions, product development/designs or modifications, etc. The subject component is not relevant in the study methodology unless it involves discipline like, ergonomics, safety engineering, brain-artificial intelligence model, or electrocardiography, which may require human/organism/participation in an experiment. However, in a routine engineering related investigation, the elements of the assessment method are discussed below.

12.1 Apparatus

Experimental physical/lab equipment, tools, or instruments like questionnaires and software used for experiment or data collection shall be stated in this section. An experimental design or process diagrams can be drawn here if applicable in the context. The diagrams should be simple and in partnership with verbal descriptions. The purpose of drawing is to demonstrate steps of experimental process how it works. Remember, the term, “experimental” is connoted to tests conducted in a laboratory/workshop control, not uncontrolled studies conducted in industries or communities.

12.2 Procedure

In this section, an investigator describes the detailed procedures how he/she did carry out the experiment or studies including measurement process. The investigator specifies type(s) of test(s) employed for data analysis, like SL (specification limits) or PC (process control) tools, NOVA or multiple coefficient correlation test, etc. Traditionally, the passive voice sentences are more common for reporting an experimental procedure(s) already executed for a particular data collection.

12.3 Result

In this section, the investigator shall report and display the result of the experiment or study clearly and accurately. The tables and figures including the obtained values are described here. The investigator also needs to distinguish between the values that were actually measured and the values computed from the measurements, or the values obtained from accepted standard(s). He/she shall include in the report all measurements the way, in which they were recorded during data gathering.

12.4 Discussion

This is very important section of your document. Depending on the nature of the study/experiment, the discussion takes place in this section. The values in the tables and figures stated above are interpreted and analyzed including causal-effect relations as well as, relationships of parameters one another. Here, the investigator discusses the outcomes of the assessment. Interprets the figures and tables displayed in the Result section, examines if coherent with hypothesis and intended aims (sought to determine by this experiment/study); he/she also, makes comparison with any pervious works and theoretical consensus whether the outcome is in conformance or disagreement, of course, in this particular paragraph, the investigator is expected to cite appropriate sources, to support his discussion and analysis. In addition, the investigator discusses any possible extraneous variables, or/and data inaccuracy
or measurement errors that probably interact to produce the erroneous result. Finally, closes this section by summarizing or making conclusive statement 3 to 5 lines on the points discussed in this section only.

In the APA format, this section is entitled Discussion, Analysis is not included unless improved in the latest edition.

As a student, in your final year project paper, if data is collected from industry, you don’t have to label this section Discussion, instead you can alternatively list the following headings:

12.4 Pertinent Problem (alternative heading)

Describe, discuss and list here the problems you found from the company where you investigated. Of course, you can use any heading as far as it is relevant to the issue you are dealing.

13. Measure Taken

Give this heading if there were any measures taken by the company itself to tackle the above problems otherwise this heading is not needed.

14. Solution to the Problem

This section is proposed by you as project assignees to solve the problem(s) stated in (11.4).

15. Implementation Procedure/Manual

The student must outline detailed the implementation procedure how to implement the solution proposed in item 13 if appropriate. The required procedural detail is, for example, illustrated in section 9. How to organize the manual/procedural sentences depends on the subject, but what is common is it should be detailed, clear and concise. For example, this paper is the guideline, if it were manual, it could be detailed than the present level.

16. Methodology versus Design

The methodology components described above are not necessarily applicable in design development. However, the author advises that an introductory section of design document be able to explain the following points:

a) A brief & concise statement what is to be designed
b) The problems with the previous design if it is modification.
c) Planned solutions if it is design modification
d) Achievable objectives
e) Design tasks to be done
f) Input requirements, skills, materials and equipment needed to carry out the design.
g) Design output requirements (expected design document)
h) Design review procedure
i) Design testing procedure if a prototype is applicable
j) Difference between the existing design and the one you revised or produced if appropriate

17. Conclusion

The student can make conclusive statement. The conclusion shall state if:
a) The student (project assignees) has learned something from the project, for example, they can say, the authors learn the following: ________________________________
b) The objective(s) of the project was met, for example, the students can say, the assignees outlined objective to determine whether ______________ causing ________. The present study has confirmed/indicated that …___________________________.
The project assignees should able to relate their conclusion whether the project objective(s) is met or not.

18. Recommendation

The student can outline the recommendation if he/she has justifiable recommendation in relation to the problem elevation.

19. Summary

Generally, there should be summary for the project paper at the end of the document, before reference list. The summary should embrace the whole document. About a 100 page document can be summarized 2-3 pages. Alternatively, the document may have the summary at the end of every chapter rather the whole summary, which is simpler than the former approach.

Remember, these project topics covered here are important and applicable commonly, of course, the project headings are not limited to these. The number and nature of headings and subheadings various from paper to paper, please refer section 3 how to develop headings and subheadings.

20. Typing Spacing, Indenting and Page Numbering

In the APA format, manuscript is double spaced through out text, including a cover page unless there is any possible modification in the latest edition. An author who plans to submit his/her manuscript to a publisher, who uses the APA guideline, shall follow the double spacing
instruction. For the student project papers, it is necessary to make some modifications as indicated below for paper cost reduction. It can be implemented as follows:

- All text shall be typed on Microsoft Words and equations with Microsoft equation editor, except numeric data may need Excel help and the following formats for related set ups:
  - All text, except a cover page 1.5 space (see the cover page spacing instruction in section-1)
  - Above and below heading double space
  - Between paragraphs without heading, for a block paragraph doubled space, for indented paragraph the same as text space (1.5)
  - Paragraph indention, one TAB if using indented paragraph writing
  - No indention for block paragraph writing
  - Five letter indention for reference list if using the indented paragraph writing approach, if writing the block paragraph style not needed (find additional information from the reference listing section); this can be done by selecting hung up under page set up, indention
  - Regard to margins, accept default margins without modification, which you find on computers
  - Use for page numbering Arabic numbers (1 2 3 4 …) from the beginning to the end

Regarding to, the block paragraph writing, this document is composed in the block paragraph format, as a result, there is no need to produce more examples here. But, the following are the examples of indented paragraphs that can be composed in the regular font, Time Roman:

A labor committee and management at a textile firm have an internal agreement to ensure industrial peace and materialize objectives of the organization. The parties’ accord includes recognition of a trade union that to be formed, annual profit sharing if more than 15%, health insurance for the employees more than 5 years services, disability compensation for all employees, holiday pays, bones and other relevant issues. On basis of the agreement, the workers have organized themselves establishing a labor union (trade association). Then, the association has quested for the company's management recognition, as a legal entity to represent the employees.

But, the management body has declined to recognize the newly formed labor union. In part of management, there is strong feeling that trade union is product of a few militant individuals who have been planning to initiate adverse impact in the company. Consequently, there is implicit resentment toward the union leadership from the management side…

21. Final Year Project Target Areas

The final year project is a major and important project for our students. Of course, it is an opportunity for a student to apply his/her acquired knowledge and skills for the problem solving and creativity. Thus, the final year project should not be done just to fulfill graduation
requirements, but it must be designed for an outstanding problem solution and concrete outcome. The student shall be entitled as much as possible to do in an area he/she feels more comfortable by performing best. The project shall be done in a group or individual including in areas of:

- Power/energy
- Commerce
- Service
- Manufacturing
- Computer: hardware/software development and existing program analysis, …
- Design: product, infrastructure, or system
- Environmental safety and natural resource reservation

Project assignees may develop new innovative ideas and procedures to carry out investigation/design or duplicate previous works for possible confirmation, modification, or rejection. A project topic needs to be specific, clear and relevant to the subject matter; followed with a brief, concise description, a third party to understand what is to be covered. If it is a post-graduate program thesis, a complete proposal shall be submitted to an appropriate party. The university/faculty project proposal submission form can be used for this purpose and available at the faculty’s Graduate and Research office.

Ethiopia is the poorest country in the world, with about 110 dollars per capita. Although the country is such poor, it is allocating scarce resources to educate young people, in hope that they will create a better future for the society. Our students are expected to act in consistent with this principle to design and carry out the project in economical manner, but without compromising on quality. Cost reduction includes responsible use of equipment for desired intended in line with a manual to avoid premature tears and wears, as well as, premature failure, eventually, by developing culture of group and individual responsibilities.

**22. Deadline for Project Title Submission**

The project tiles shall be submitted every year in the first week of December by the students and advisors or any staff members and industries affiliated to the faculty. Priority shall be given to the titles submitted by the student themselves. The student can build a final year project on a mini project completed in the first semester, or the junior year in consultation with a respective advisor on the basis of the innovative nature of a project. When the titles selected by the assignees are irrelevant or the student failed to submit, the industry and staff titles shall be considered respectively, giving priority for the firms’ needs. The assumption is every department will keep in touch with industries to secure their involvement in the project process. When the same title is selected by different groups of the project assigns, it can be handled on the first come first serve basis, or the department can develop internal criteria to deal with the issue. The whole process of the title selection should be completed as of January 4th or before. Once the assignees have known their subject area, they shall be outline project task descriptions and present to a respective advisor. Then, the advisor revises the description
and secures complete paper works including getting signatures of the assignees. If the task description drafted by the students is inadequate, the students should be instructed how to modify it, otherwise, the advisor can review and modify the description in full or partial. The details of project tasks are dependent on the nature of a particular discipline. The example is demonstrated in Form-1 indicated below. Also, the alternative form is available in html document, for the same purpose, for the students who want to fill the form online, in scenario that the university’s web site will be upgraded to an interactive level.
Form-1: The example of the final year project task description

BDU, Faculty of Engineering, Industrial Engineering Department

Project Assignment for Final Year Students

Project Title: Preventive Maintenance Process in Bahir Textile Share Co

Major Project Tasks
At minimal, the project should cover/determine:
1. Relevant literature review, including types of maintenance
2. Project Objectives
3. Assessment Method
4. Types of Maintenance Currently in Effect in the Organization
5. Effectiveness Versus Deficiency
6. Major Causes of Deficiency if Appropriate
7. Nature of Proposed Preventive Maintenance
8. Justification for Proposed Maintenance
9. Required Resources for Implementation
10. Detail Procedures for its implementation (inclusion of computerized program preferred, but not required)
11. Conclusions and Recommendations
12. Summary

Project submission date: ___the date designated by the department
Initial draft completion date: ___April 18, ______
Experiment work completion date: ___ April 25, ______

Advisor’s name: ________________________________Signature
Co-Advisor’s name: ________________________________Signature
Department Head: ________________________________Signature

As the project assignee, I have understood the terms and conditions described in this document and the Student Project Guide. I have also understood my responsibilities in fulfilling the requirements within the given timeframe.

Assignees’ Name and Signatures:
1- ___________________________________Signature _______________________
2- ___________________________________Signature _______________________
3- ___________________________________Signature _______________________
23. Project Evaluation Forms

The project papers should be evaluated across instructors in a consistent manner, quality work to be rewarded contrary to a poor output. To establish grading consistency in evaluation for paper marking and presentation/defense, uniform advisor and jury rating forms have been developed and used by the faculty since 2008, of course, it is a credible effort deserves recognition. The author has revised these forms and embedded into the document (see form-1 and 2). As shown in the form, 60% of the score is allocated to the advisor evaluation while the remaining 40% is appraised by the jury. This proportion is just exceptional for final year projects, but for a course based projects/non-final year projects maximum scores for presentation and defense activities together or jury evaluation should not exceed 30%. Among jury criteria used in the 2008, only variable eliminated from the form is called “personality”. A reason for removal is actual personality evaluation requires a professional in the field. A layman personality appraisal is more often biased with dressing and physical grooming that may punish causal dressers. The 2-point score allocated to this variable has been added to the answering questions column, raising its score from 3 to 5. The definitions of the remaining components in the forms are already known by the staff and consequently there is no need to describe them here. Both forms can be kept on an excel file for the score entry and computation.
Form-2: For advisor evaluation at 60%

<table>
<thead>
<tr>
<th>S.N</th>
<th>Student Name</th>
<th>ID No.</th>
<th>Project Title</th>
<th>10%</th>
<th>20%</th>
<th>10%</th>
<th>20%</th>
<th>60%</th>
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</tbody>
</table>

I verify that the above marks are fair and true to the best of my knowledge.

Date  Advisor’s Name  Signature

Approved by:

Date  Department Head  Signature
Form-3: For Jury evaluation at 40%

<table>
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<th>S.N</th>
<th>Student Name</th>
<th>Project Title</th>
<th>Format</th>
<th>Report Organization</th>
<th>Communication</th>
<th>Skill</th>
<th>Content and clarity</th>
<th>Time Management</th>
<th>Answers to questions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>40%</td>
</tr>
</tbody>
</table>

I verify that the above marks are fair and accurate to the best of my knowledge.

Name of Jury | Signature
-------------|------------
1             |            
2             |            
3             |            

Date of Submission: _______________________

Approved by:

Date | Department Head
24. How to Cite in Text and List References in APA Format

There are recognized standards for citations and reference listings. Commonly known research writing standards are the APA and ELA (English Language Association) formats. Differences between the two are not such significant, except the APA appears to be more precise, especially in the text citations and reference list. Both formats cite the sources of references in the text by author’s name followed by the date in parentheses. If a referred work has more than three authors, especially, in the APA format, the first author’s name as indicated in the source document is acknowledged followed by “et al.” (which means the first author and others)? In a reference list, in APA, an author’s name is followed by the date in parentheses, whereas, the date comes at the end of sentences in the ELA, and the latter also capitalizes the first letters of words made of the title plus uses inverted quotations for the articles of titles published in periodicals unless there is modification in the latest edition. There is also another alternative traditional writing format, which cites a roll number in the text that corresponds with the author’s name in bibliography (reference list). A few institutions and individuals still use this format.

In this guideline, the APA format has been covered in details, including relevant examples, because it is the standard that has been approved by the university, as mentioned in the introduction section. Consequently, the students are advised to use this standard for their project or research works. Regard to reference listing, Bahir Dar Journal of Education (2006) has done good job in its Guide to Authors section. It is used as a reference in this document and based on that the author (the author of this) has just cooked up the examples, or descriptions.

24.1 Example of Text Citations in Paragraph

Computer storage can be defined as a temporary or permanent collection space for data. For Minasi et al. (2003), items "like page file master, file table partition table and clusters make you shudder because they remind you of how much you don’t know about what goes on beneath the operating system." Here, the point is to make the concept of storage one more piece of the puzzle that an ordinary person doesn't know well. Usually, when someone refers to storage in a computer environment, he/she is particularly talking about hard drives, the file systems on those drives, and what one can do with those file systems to organize data making it easier to manage.

Anderson et al. (2003) also explains the computer storage concept in coherent with the above notion, and discusses the superiority of the latest version (Window server 2003) over Window 2000 and new technology (NT 4.0) in terms of user interface. In his words:

The storage features have even been improved upon in Server 2003. There are also some useful new features that Server 2003 gives us to make our lives even easier. One of these new features, Volume Shadow
Copy Service, which was introduced in XP and is available in Server 2003, could make the sysadmin's [system administrator's] task of restoring users' lost files a thing of the past. You can now extend basic disks in Server 2003, and Microsoft has made the job of recovering from a failed mirrored system disk much easier. (p. 829)

If you are citing ideas and rephrasing in your words, keeping in the inverted quotation is not necessary, except citing the author’s last name followed with the date of the publication. More than one sources also can be cited in a single paragraph depending on the nature of a argument. Whenever you do quote, you have to provide a page number of source. A short quotation is usually integrated in a given paragraph, but if the quotation is long, perhaps, more than five lines, you need to illustrate in a separate paragraph, as indicated above, the second paragraph.

24.2 Examples of Reference Listing

Generally, in reference listing or bibliography an author’s last name in full, the first name initial and the middle name initial, date, title of source subject, place and publisher (no place for periodicals) are listed orderly. Some authors may not have the middle names and in that case, the last names and the first initials are indicated. The list must be in name alphabetical order. The detail examples are illustrated below.

24.2.1 Periodicals, magazines, news papers, likes which published regularly, but less than professional journals in a status.

For magazine articles:


For newsletter articles:


For newsletter articles without author(s):


24.2.2 Abstracts

For abstract from original sources:

For abstract from secondary Sources:


### 24.2.3 Entire Books and Chapter in Books

**For books:**


For Books with more than three authors use “et al.”


**For books by agencies:**


**For chapter in book:**


### 24.2.4 Meeting or Symposium Procedures

Symposium article published in irregularly published proceedings or book chapters:


For unpublished symposium sources:

24.2.5 Unpublished Documents, Like Doctoral Dissertation, Master Thesis and Senior/Final Year Project Papers


24.2.6 Sources from Internet

For online journals:


If the above document was retrieved via ftp (file transfer protocol):


For multi page documents maintained by private organizations without date:


25. For Sources from Interviews


Notice: Items that don’t have to be included in reference list are dictionaries; they are not required in the bibliography except in the text citations in the appropriate context. Also, citations as well as, reference are not required for common formulas, or equations that an author is not traceable.

26. Appendix

An appendix contains lengthy detailed data such as tables, derivations, experimental instruments used for the investigation if the procedure is new. All items attached in the appendix section shall be referred in the text specifically so that the reader can find it (for example, by saying “see Appendix, A”). In the APA format, subtopics in an appendix are labeled in the capital letters, not numbers otherwise it is revised in the latest edition.
References

[Please note that the reference below is not the part the examples, but the reference to this document. Indention is not needed since this document is written in block paragraphs.]


