

## Content and Format of Engineering 451/551 Reports

Lab reports and Term Project reports should be viewed as formal technical reports, written in the third person. At a minimum the lab reports should include the following sections.

### 1. Introduction

Provide a brief description of the problem setting and a statement of the objectives for the exercise.

### 2. Literature Review (*optional for lab reports*)

Review the literature pertinent to your topic. This is **not** an annotated bibliography, but rather a well organized review of what previous researcher and engineers have published related to your topic.

### 3. Methodology

Describe the approach used to meet the stated objectives. The governing equation(s) should be included and each term in the equation(s) should be described as illustrated below.

$$y = mx + b \quad (1)$$

where:

$y$  = BOD concentration (mg/l)

$x$  = COD concentration (mg/l)

$m$  = regression constant (slope of the line)

$b$  = regression constant (y-intercept) (mg/l)

The algorithms used should be described in sufficient detail that an otherwise informed reader could implement your problem solving approach. Please cite references using the author/year style. Some examples of this citation style are given below.

It can be shown that the BOD concentration will always be less than the COD concentration (Adams and West, 1992; Smith, 1995). Jones et al. (1991) found that a simple linear equation was often an adequate model for the relationship between COD and BOD.

### 4. Application

Describe the application of the stated methodology to the problem. Provide tables of important model parameters, initial conditions, boundary conditions, etc. used in the application.

### 5. Results and Discussion

Provide a description of the outcome of applying the stated methodology to this particular problem. Use tables (with titles at the top in sentence format), and figures (with titles at the bottom in sentence format) to highlight the important findings. Each table and figure should be described in the text. Provide a detailed discussion of the results, including an examination of the sensitivity of the solution (or design decision) to different solution algorithms, algorithm parameters, and input and model errors or uncertainties.

### 6. Conclusions

What can be concluded from the results. After an introductory sentence, this section may be in an itemized (list) style. Be sure you only draw conclusions from what was observed in this work.

### 7. References

List any references you cited here in the following format.

1. Adams, Robert L., and Tom E. West. 1992. *Clarifier Design in Tropical Regions*. Water Research, 44(3), pp201-208.

2. Jones, Ed, David S. Bowles, and Bruce Beck. 1991. *A Simplified Approach to Modeling BOD Removal in Trickling Filters*. In, *Mathematical Models of Wastewater Treatment Processes*, P. Lessard, ed., Wiley, New York, 402p.

7. **Appendix**

Copies of the raw data sheets and sample calculations.

The term projects should be viewed as facility plans and include the following topics.

1. **Introduction**
  - a. Background
  - b. Purpose and scope of the project
  - c. Goals or objectives of the project
2. **Basis of Design**
  - a. Population
  - b. Flows
  - c. Projected changes in service area, water use, population
  - d. Effects of any trends with regards to water conservation, industrial pretreatment, etc.
3. **Regulatory Requirements**
  - a. Water quality standards
  - b. Biosolids standards
  - c. Permits required, agency approvals required
4. **Existing Facilities**
5. **Development of Preliminary Alternatives**
  - a. Screening mechanisms (how alternatives will be evaluated)
  - b. Description of alternatives
  - c. Results of preliminary screening
6. **Description of Selected Initial Alternatives**
7. **Detailed analysis of Initial Alternatives**
  - a. Construction costs
  - b. O/M costs
  - c. Permitability
  - d. Other criteria that community has established
8. **Recommendations – Recommended Alternative(s)**
9. **Conclusions**