Contents

Hazards

HAZARD: Rotating equipment / Machine tools

Be aware of pinch points and possible entanglement.
Personal Protective Equipment: Safety goggles; standing shields; sturdy shoes.
NO: Loose clothing; Neck ties; Scarves; Jewelry (remove); Long hair (tie back).

HAZARD: Projecties / Ejected parts

Articles in motion may dislodge and become airborne.
Personal Protective Equipment: Safety goggles; standing shields.

HAZARD: Heating — Burn

Be aware of hot surfaces.
Personal Protective Equipment: Safety goggles; high temperature gloves; welding apron; welding jacket; boot gauntlets; face shield.

HAZARD: Chemical — Burn / Fume

Use adequate ventilation and/or rated fume hood. Make note of safety shower and eye wash station.
Personal Protective Equipment: Safety goggles; chemically rated gloves; chemically rated apron.

HAZARD: Electrical — Burn / Shock

Care with electrical connections, particularly with grounding and not using frayed electrical coords can reduce the hazard. Use GFCI receptacles near water.

HAZARD: High pressure air-fluid / Gas cylinders / Vacuum

Inspect before using any pressure / vacuum equipment. Gas cylinders must be secured at all times.

HAZARD: Water / Slip hazard

Clean any spills immediately.

General Instructions

The Engineering Materials and Processes Laboratory Manual is designed for a 16 week course of instruction using your textbook as part of the lecture. The purpose of the laboratory portion of this course is to relate the theory discussed during the lecture to actual practice.

This laboratory will not only give students knowledge of the principal laws for determining material properties, it will also demonstrate how common industrial materials are tested, how cutting machines and tools are used, and how to pursue a literature search.

I Laboratory Groups

Sections in the laboratory will be divided into groups of four or five students. One member of each group will act as a group leader for each laboratory module. The responsibility of group leader will change with each laboratory module. This is done so that each student can learn the principles of leadership. The function of the group leader is to organize the experimental group, assign tasks, and ensure the proper return of equipment and tools. It is absolutely required that even though a group leading is designated, each member of the group is to make himself familiar with all phases of the module.

II Safety Precautions

1. Before any experiment is started or equipment turned on, instructor approval must be obtained.
2. Keep your mind on your work, watch the equipment being used, and stop and ask for help if in doubt.
3. Wear safety glasses at all times, and remove or tie down loose clothing.
4. Wear personal protective equipment for all heat treatment experiments.
5. Keep your fingers away from the tool and workpiece while machinery is running.
6. Keep your hands out of the load train when using the uniaxial testing machine.
7. Report any cut, scratch, or accident to the laboratory instructor immediately.

III Rules for Cleaning Up

Allow five minutes before the end of the class to clean up. All items used must be put in their proper place and returned prior to leaving.

IV Attendance

Students must be present at each of the scheduled lab class meetings. If a student is more than 15 minutes late, attendance for that lab class period will not count, and a makeup must be performed. Individual participation is required for every laboratory exercise, and any work missed as a result of illness or emergency must be completed as a makeup. As noted in the course guidelines, a makeup form is required so that proper attendance may be recorded. Aside from moodle, the makeup form may be found in the Appendix and online.

V Pre-lab Quiz

Pre-lab quizzes are given in the first 15 minutes of the lab class, these simple quizzes serve to take attendance, as well as ensure that students have read the manual prior to the lab.

VI Grades

The grade in the laboratory will depend on the quality of the laboratory report submitted, and will be marked on a scale of 0–10. Do not forget that a significant portion of the final grade for the course is based on the laboratory. All reports must be carefully and neatly prepared. Written work that includes gross spelling or grammatical errors or is not neat and easy to read will come at a penalty . Work which includes gross technical errors will not be considered satisfactory regardless of its literary quality.

VII Due Dates for Reports

The report for a particular experiment is due the day (or evening) that the next experiment is scheduled. Or, in other words one week after completion of an experiment. A report will be considered late *fifteen* minutes after the lab period has started and a reduction will be made at the rate of 10% each working day late. If performing a makeup, then the report is due one week after the makeup, and the completed makeup form attached. Only hardcopies may be submitted, electronic copies will not be considered, and email is never an appropriate method of submission.

VIII Report Format

VIII.I Cover page

The cover page provided online is to be used, and all sections should be filled accordingly. Lab reports with an incomplete cover page will not be accepted. Aside from moodle, the cover page may be found in the Appendix and online.

VIII.II Table of contents

A table of contents is a list of the major sections of a document, along with the corresponding page numbers. Any style is acceptable so long as it is consistent and clear.

VIII.III Abstract

The abstract is a concise statement describing what the laboratory module is about. It should contain the purpose, background, the methods and equipment used, and finally the results and main conclusion.

VIII.IV Introduction

This section should identify the experiment, the objectives, and overall background and importance.

VIII.V Procedure

In general this will be a brief outline of the procedure provided in the laboratory manual. A note of caution, it is considered plagiarism to copy and paste directly.

VIII.VI Original data sheet

Data is recorded during the laboratory experiments, and signed by the instructor. The original, a scan, or a copy should be included in the written report. In some cases, the data is electronic and is not necessary to repeat.

VIII.VII Final results and calculations

This section should include a set of neat and organized sample calculations. Care should be taken to make note of units and the meaning of terms and formulas used. Results should be clearly plotted or tabulated.

VIII.VIII Discussion

While you may be brief, this section should include a discussion of the results, and how they confirm or reject the objectives. If the data appears to be unreliable, please provide possible an explanation (e.g., surface oxide, poor polishing, etc.).

VIII.IX Conclusion

The conclusion is no longer than a few short paragraphs. It should contain your evaluation of how the results support the purpose of the experiment and your intelligent evaluation of weather the objectives were achieved.

VIII.X Questions and answers

Answer all the questions provided in the laboratory manual. First repeat the question, followed by your answer.

VIII.XI References

Bibliographic information for all references cited should be included following the consistent format of your choice.

VIII.XII Appendices

An appendix should include detailed calculations, and any other data relevant to the experiment.

Note

Each student in the group must be prepared and familiar with all phases of the module in advance. Read the module and the related chapters suggested before coming to the laboratory. Please bring all your suggestions or constructive criticism regarding any aspect of the laboratory to your instructor or course supervisor.

Appendix

The following pages contain:

1. Lab report cover page
2. Lab makeup form

Experiment No. _____ Report Submitted by _____

Date Performed _____ Section _____ Date Submitted _____

Instructor _____ Course No. _____

Course _____

MECHANICAL ENGINEERING LABORATORY
NEW JERSEY INSTITUTE OF TECHNOLOGY

_____

Experiment Title

Performed by group: _____ with TA: _____

Group members: _____

(Indicate Leader) _____

_____

_____

Students are not to write below this line

CORRECTIONS

Date Received	Date Returned for Corrections
_____	_____
_____	_____

☐ Form	☐ Calculations	☐ Discussion
☐ Procedure	☐ Curves	☐ Conclusion
☐ Data	☐ Sketches	☐ See pages _____
☐ Spelling	☐ Structure	☐ Grammar

Comments: _____

_____

_____

(For further comments see inside cover.)

☐ Report Accepted _____ Days Late

☐ Correct and Return _____ Days Late

Corrected by: _____ Grade: _____ Date Accepted: _____

Mechanical Engineering
New Jersey Institute of Technology

ME215 Engineering Materials and Processes
Laboratory Makeup Attendance Form

Instructions: This form should be fully completed at the time of the makeup lab. Further, it should be attached just after the cover page of a submitted lab report.

Student Name _____

Regular Professor _____

Experiment Title _____

Date Missed _____

Date Performed _____

Group members: _____

_____

_____

_____

Students are not to write below this line

Instructor Signature (at the makeup) _____

TA Name and Signature (at the makeup) _____

Date of the makeup _____

Instructor Signature (of your regular section) _____