

**STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK**



MASTER SYLLABUS

**COURSE NUMBER – COURSE NAME
MECH 221 – ENGINEERING MATERIALS LABORATORY**

Created by: Cullen Haskins

Updated by:

Canino School of Engineering Technology

Department: MECHANICAL ENGINEERING TECHNOLOGY

Semester/Year: FALL 2018

A. **TITLE:** ENGINEERING MATERIALS LABORATORY

B. **COURSE NUMBER:** MECH 221

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

Credit Hours: 1

Lecture Hours: per week

Lab Hours: (1) two-hour per week

Other: per week

Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes No

E. **GER CATEGORY:** None: Yes: GER
If course satisfies more than one: GER

F. **SEMESTER(S) OFFERED:** Fall Spring Fall & Spring

G. **COURSE DESCRIPTION:**

This course provides hands on experimentation in materials testing as it relates to material properties for ferrous and nonferrous metals, concrete, plastics and wood. Technical report writing that meets industrial accepted standards is required.

H. **PRE-REQUISITES:** None Yes If yes, list below:

ENGS 101, or permission of instructor

CO-REQUISITES: None Yes If yes, list below:

I. STUDENT LEARNING OUTCOMES: (see key below)

By the end of this course, the student will be able to:

| <u>Course Student Learning Outcome</u> <u>[SLO]</u> | <u>Program Student Learning Outcome</u> <u>[PSLO]</u> | <u>GER</u> <i>[If Applicable]</i> | <u>ISLO & SUBSETS</u> | |
|--|--|---|--|--|
| A. Collect, organize, and report data using spreadsheet software for data analysis | PENDING ABET OUTCOME UPDATE | | 1-Comm Skills 2-Crit Think 5-Ind, Prof, Disc, Know Skills | W PS Subsets Subsets |
| B. Write technical reports that meet accepted industry practice | | | 1-Comm Skills 2-Crit Think 5-Ind, Prof, Disc, Know Skills | W PS Subsets Subsets |
| C. Conduct material testing to ASTM standards and verify theoretical equations | | | 1-Comm Skills 2-Crit Think 5-Ind, Prof, Disc, Know Skills | W PS Subsets Subsets |
| D. Build team working skills and explain technical data in oral presentations | | | 1-Comm Skills 4-Soc Respons 5-Ind, Prof, Disc, Know Skills | O T Subsets Subsets |
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| KEY | <u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u> |
|---------------|---|
| ISLO # | ISLO & Subsets |
| 1 | Communication Skills Oral [O], Written [W] |
| 2 | Critical Thinking <i>Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]</i> |
| 3 | Foundational Skills <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i> |
| 4 | Social Responsibility <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i> |
| 5 | Industry, Professional, Discipline Specific Knowledge and Skills |

*Include program objectives if applicable. Please consult with Program Coordinator

J. **APPLIED LEARNING COMPONENT:** Yes No

If YES, select one or more of the following categories:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Classroom/Lab | <input type="checkbox"/> Civic Engagement |
| <input type="checkbox"/> Internship | <input type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input type="checkbox"/> Research |
| <input type="checkbox"/> Practicum | <input type="checkbox"/> Entrepreneurship |
| <input type="checkbox"/> Service Learning | (program, class, project) |
| <input type="checkbox"/> Community Service | |

K. **TEXTS:**

None

L. **REFERENCES:**

None

M. **EQUIPMENT:** None Needed: Materials Testing Lab (Nevaldine South 110)

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Class/team participation
Experimentation and test setup
Oral presentation
Technical written reports related to experimental data

P. **DETAILED COURSE OUTLINE:**

N/A

Q. **LABORATORY OUTLINE:** None Yes

- I. Library Research on ASTM standards
- II. Hardness Test (Brinell, Rockwell B, C), and tensile strength prediction
- III. Tensile Test of Steel (hot rolled vs. cold rolled)
- IV. Tensile Test of Aluminum (2011-T4 vs. 6061-T6)
- V. Tensile Test of Cast Iron
- VI. Tensile Test Plastics
- VII. Compressive Test Concrete
- VIII. Shear Test (direct and torsional) (steel vs. aluminum)
- IX. Impact Test
- X. Cold working aluminum
- XI. Hardenability Test (Jominy End-Quench 1018, 1095, 4140)

XII. Heat treatment of tool steel

XIII. Metallography

XIV. 3 point / 4 point bend test on brittle material

XV. Compression test on wood

XVI. Bend test of wood