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

COURSE OUTLINE

ENGS 101 – INTRODUCTION TO ENGINEERING

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Revised: JF Reilly (May 2015)

CANINO SCHOOL OF ENGINEERING TECHNOLOGY
ENGINEERING SCIENCE
May 2015
A. **TITLE:** Introduction to Engineering

B. **COURSE NUMBER:** ENGS 101
   **SHORT TITLE** Introduction to Engineering

C. **CREDIT HOURS:** 2

D. **WRITING INTENSIVE COURSE:** (OPTIONAL)

E. **COURSE LENGTH:** 15 weeks

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

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   Two 2-hours of laboratories per week

H. **CATALOGUE DESCRIPTION:** The course introduces students to the various engineering disciplines, professional organizations and ethical aspects of professional expectations. Engineering analysis introduces problem-solving, engineering computations, manual sketching, and work presentation. Hands-on challenges engage the student in the design process, team work and critical thinking. Local expectations regarding written communication and oral presentations are presented and reinforced through projects.

I. **PRE-REQUISITES:**
   **CO-COURSES:** Co-requisite MATH 123 or MATH 121 or above

J. **GOALS (STUDENT LEARNING OUTCOMES):**
   By the end of this course, the student will:

<table>
<thead>
<tr>
<th>Course Objectivesa</th>
<th>Institutional SLOb</th>
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<tbody>
<tr>
<td>Demonstrate familiarity with the engineering profession and the professional responsibilities and expectations of engineering practitioners.</td>
<td>3</td>
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<tr>
<td>Demonstrate acquisition of the common attributes that lead to success in college and in an engineering career.</td>
<td>3,4</td>
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<td>Demonstrate the ability to operate the computer applications considered essential in the pursuit of engineering study.</td>
<td>1,3</td>
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<tr>
<td>Demonstrate the ability to interpret technical drawings and prepare hand-drawn sketches that effectively communicate technical information.</td>
<td>1, 3</td>
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<tr>
<td>Effectively present ideas and concepts to other engineers in an oral and written manner.</td>
<td>1.</td>
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<td>Work effectively in a team environment.</td>
<td>4</td>
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a Subcomponents/details of the learning outcomes are appended J1
b Institutional SLO’s
   1. Communication
   2. Critical Thinking
3. Professional Development
4. Interpersonal Skills

K. **TEXTS:** (suggested) *Thinking Like an Engineer*, Stephan and Park, Pearson Publishing

L. **REFERENCES:** *Introduction to Engineering*, Pond; *CSOET Communication Manual*, A. Rygel 2014

M. **EQUIPMENT:** Computer Lab.

N. **GRADING METHOD:** (P/F, A-F, etc.): A-F

O. **MEASUREMENT CRITERIA/METHODS:** Homework, Projects, Exams, Oral presentation

The following skills **must be demonstrated** in order to pass the class:

1. Ability to convert units accurately and in the format prescribed.
2. Presentation of solved problems in the prescribed format.
3. Demonstration of a high level of “academic discipline” as demonstrated by strict adherence to attendance policy and timely submittal of assignments in the prescribed format.
4. Prepare xy graphs (scatter plots) by hand and in excel (or MatLab) in accordance with prescribed format.
5. Preparation of a least one moderately sophisticated report prepared in the prescribed format.
6. Demonstration of an appropriate application of engineering ethics with student peers (public safety, respect of others, a respect for diversity, application of professional and personal ethics).
7. Ability and willingness to work cooperatively with a team and contribute effectively toward a group assignment.

P. **DETAILED TOPICAL OUTLINE:** See Attached Sheet

Q. **LABORATORY OUTLINE:** N/A
DETAILED COURSE OUTLINE
(Presentation is not restricted to the order presented here.)

I. History of Engineering
   i. Ancient history
   ii. A hundred years ago
   iii. Engineering today

II. Explore various engineering disciplines
   i. Aeronautical and Aerospace, Mechanical, Electrical and electronics, Civil, Environmental, Chemical

III. The Engineering Profession
   i. Path to licensure
   ii. PE responsibilities
   iii. Ethical considerations and consequences

IV. Introduction to graphic communication
   i. Reading Engineering diagrams and plans
   ii. Graphic design process
   iii. Alphabet of lines
   iv. Standards and conventions
   v. Tools
   vi. Sketching
   vii. Lettering
   viii. Orthographic drawings and sketching
   ix. Isometric drawing and sketching

V. Engineering Design
   i. Traditional engineering
   ii. Concurrent engineering
   iii. Prototyping
   iv. Steps in design
      1. Problem statement
      2. Analyze the problem
      3. Concept Development
      4. Alternatives
      5. Configuration of Design
      6. Final design and documentation

VI. Engineering analysis and problem solving
   i. Problem-solving approaches
   ii. Presentation of work (IAW communication manual)
   iii. Unit conversions
   iv. Dimensional Analysis
   v. Preparation of graphs
   vi. Use of software applications in problem-solving and analysis
      1. Excel (All students expected to be able to use excel)
      2. MatLab

VII. Communication
i. Guidelines for effective writing

ii. Design notebook
   1. Written Reports
      a. Lab reports
      b. Letter reports
      c. Design Reports
   2. Oral Reports
   3. Use of “powerpoint”
Demonstrate familiarity with the engineering profession and the professional responsibilities and expectations of engineering practitioners. Including

- Select one engineering discipline that is most appealing and why.
- describe what civil, mechanical and electrical engineers “do”
- Describe the typical path to a PE license
- Cite and discuss the responsibilities to the public, clients, and the profession, of those who practice in the engineering professions
- Properly assess the ethical concerns associated with a engineering dilemma.
- Participate in a professional club campus chapter such as ASCE, ASME, ASEE

Demonstrate acquisition of the common attributes that lead to success in college and in an engineering career including:

- Uses campus academic services effectively
- Note taking skills
- Organization of course materials
- Participation in campus activities
- Conscientious adherence to attendance and syllabus requirements of all courses
- Ability to set and adhere to priorities that contribute to the accomplishment of goals
- Ability to create a plan and follow it
- Works effectively in a team as both a contributor and leader
- Be able to apply a systematic process in engineering problem solving and design
  - Follow the prescribe analytic method in performing a design
  - Solved problems are presented in the prescribed format
  - Able to convert units and perform dimensional analysis
- Able to follow the rules for reporting solutions in the correct number of Significant Figures
- Use penmanship that is of proper size and legible.

**Demonstrate the ability to operate the computer applications consider essential in the pursuit of engineering study.**

- Use word effectively in the preparation of a lab report, resume,
- Use powerpoint effectively in the preparation of an oral report
- Use Spreadsheet software (Excel) effectively to process data and prepare and analyze graphs.
- Use the internet effectively
- Use the on-line interface (Angel or Blackboard)
- Calculator training is also provided
- MatLab may also be introduced and required to the degree thought appropriate by instructor

**Demonstrate the ability to interpret technical drawings and prepare hand-drawn sketches that effectively communicate technical information.**

- Able to interpret a 3D object into orthographic views
- Able to create a 3D (isometric) sketch of an object
- Uses a flow chart to demonstrate plan
- Present problem solutions which include labeled, dimensioned sketches of given information

**Effectively present ideas and concepts to other engineers in an oral and written manner**

- Follows the writing process in preparing a written paper
- Follows the communication manual in preparing reports
- Contributes to group discussions orally and on line
- Give a 5 – 10 minute speech (Supported by powerpoint)
• Documents resources in accordance with accepted protocol

• Critically evaluate the degree of success achieved in a design project

**Participate in and contribute equitably in a group design and construction project activity or experimental investigation.**

• Receive a passing evaluation of peers