Course Administration

INSTRUCTOR: Jeff Ge, 113 Light Engineering, (631) 632 8305  
E-mail: Qiaode.Ge@stonybrook.edu

OFFICE HOURS: TuTh (2pm-3:30pm) or by appointment.


PREREQUISITES: MEC 310 and MEC 102

LECTURE HOURS: TuTh (8:20am-9:40am)  
112 Harriman Hall

TEACHING ASSISTANT Ms. Ping Zhao  
pzhao@ic.sunysb.edu

HOMEWORK: About one homework assignment per week.  
Each homework is due one week after it is assigned.  
- Late homework will receive half credit and will not be accepted after the solutions are posted.  
- Homework will only be accepted at the beginning of the class on the specified due date.

PROJECT: Each design project will be carried out by a team of two or three students. A written report is required.

EXAMS: 2 Quizzes (in class, 55 minutes)  
1 Final Exam  
- No makeup exam unless arranged prior to the exam.

GRADING:  
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<tr>
<th>Component</th>
<th>Percentage</th>
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<tr>
<td>Homework</td>
<td>20%</td>
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<tr>
<td>2 Projects</td>
<td>20%</td>
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<tr>
<td>2 Quizzes</td>
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<tr>
<td>Final</td>
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(5/11, Tuesday, 11:15am-1:45pm)
BLACKBOARD: All homework assignments and solutions will be posted on the Blackboard course account (http://blackboard.sunysb.edu). For problems logging in, go to the helpdesk in the Main Library SINC Site or the Union SINC Site, you can also call: 631-632-9602 or e-mail: helpme@ic.sunysb.edu

I use email and blackboard exclusively to communicate with you off class. It is your responsibility to make sure that your email id is a current one on the blackboard system. I suggest that you use a university email id for this class; it is free and official. I am not responsible for the emails not delivered to your commercially available email accounts.

ACADEMIC HONESTY: The campus policies on academic honesty are available on the Web (http://naples.cc.sunysb.edu/CAS/ajc NSF/pages/info). Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, but are not limited to, copying or plagiarizing class assignments including homework, reports, designs, computer programs, graphics, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn.

SPECIAL NOTE ON ADA: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students requiring emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site http://www.ehs.sunysb.edu/fire/disabilities/asp.
Overview

Emphasis for this course will be placed on the general process of engineering design as a systematic and disciplined process. The course will cover material related to conducting a marketing analysis and patent search, formulation of design specifications and criteria, conceptual design and the evaluation of the design options, design creativity, formulation of analyzable models, design for manufacture, design for reliability, simulation and optimization techniques, engineering economics, and engineering ethics.

List of Topics

Introduction to Total Design – Conventional versus optimum design process, optimum design versus optimal control, design core.
Market Analysis – Parametric analysis, needs analysis, matrix analysis.
Product Design Specification – Contents of a PDS.
Conceptual Design – Concept generation and evaluation, method of controlled convergence, design creativity, rating/weighting method, quality function deployment (QFD).
Detailed Design – Component design specification (CDS), aids to detailed design, load line(discontinuity analysis), design for manufacture (DFM), product design core, process design core, selling.
Optimization – Optimum design concepts and design problem formulation, classification of optimization methods, Hessian matrix, Taylor series expansion, quadratic forms and definite matrices, matrix of the quadratic form, necessary and sufficient conditions, unconstrained optimum design problems, optimality conditions for functions of several variables, form of a matrix, constrained optimum design problems, constrained optimum point, unconstrained optimum point for a constrained problem, infeasible problem, Lagrange multipliers and necessary conditions.
Linear programming – Linear programming model; Gauss-Jordan elimination method, graphical solutions, Simplex algorithm.
Economic Analysis – Engineering decision making, comparisons of alternative designs.
Engineering Ethics – Case studies as presented by the National Society of Professional Engineers Board of Ethical Review.
The use of Matlab in Optimum Design

List of Course Specific ABET Outcomes
(a) An ability to apply knowledge of mathematics, science, and engineering to mechanical engineering problems.

(c) An ability to work professionally in both the thermal and mechanical systems areas, including the design and realization of such systems to meet desired needs.

(e) An ability to identify, formulate, and solve engineering problems.

(f) An understanding of professional and ethical responsibility.

(g) An ability to communicate effectively in written, oral and visual form.

(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.

(k) The ability to use modern engineering techniques, skills, and computing tools.

**Scope of Outcomes Assessment**

All six outcomes

**Method of Outcomes Assessment**

(a) Graded homework, exam and project
(c) Graded project
(e) Graded homework and project
(f) In class group discussions about distributed case studies
(g) Graded project
(h) Graded project
(k) Graded homework and project