ENGINEER 1281.01H (Approved): Fundamentals of Engineering for Honors 1

Course Description

Engineering problem solving utilizing computational tools such as Excel and MATLAB; algorithm development; introduction to C++ programming for engineering; hands-on experimentation; modeling; ethics; teamwork; written, oral and visual communications

Prior Course Number: 192.01H
Transcript Abbreviation: Fund Engr Honors 1
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Freshman
Course Offerings: Autumn
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 5.0
Repeatable: No
Time Distribution: 6.0 hr Lec, 2.0 hr Lab
Expected out-of-class hours per week: 7.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq or concur: Engineering Calculus 1. This variant of the course (ENGR 1281.01H) is the standard course. Open only to University-designated Honors students or by permission.
Exclusions: Not open to students with credit for ENGR 1181.01 or 1181.02 or CSE 1222 or ENG 191.01 or 191.02.
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: Yes
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: No

Subject/CIP Code: 14.9999
Subsidy Level: Baccalaureate Course

General Information

Engineering problem solving, MATLAB, and C++ are taught. This course is equivalent to the combination of two courses: ENGINEER 1181.0x and CSE/ENGINEER 1222. Students completing this course are considered to have credit for ENGINEER 1181.0x and for CSE/ENGINEER 1222.

Course Goals

Students will develop professional skills for success in engineering, including teamwork; written, oral, and visual communications; and ethics.
Students will understand basic elements for engineering problem solving including developing algorithms and utilizing tools such as Excel and MATLAB.

Students will be competent with writing simple C++ programs using basic C++ constructs, declarations and various program control statements for selection and repetition, and file input and output.
Students will be familiar with C++ functions, arrays, pointers, and C++ classes.
Students will have an introductory knowledge of a wide range of fundamental engineering tasks and principles gained through homework and hands-on laboratory exercises.
Students will be motivated towards opportunities within engineering careers and gain an appreciation of the range of engineering disciplines available to them.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Course introduction and overview.	1.0							
Teamwork fundamentals and team working agreements.	1.5							
Problem solving fundamentals - Problem types, systems descriptions, SI units, significant digits, understanding analysis vs. design.	3.0							
Using spreadsheets for problem solving - Excel spreadsheet structure; equations, operators, array elements; models and systems; mathematical models; plots and charts.	6.0							
Ethics for engineers	2.0							
Using MATLAB for problem solving - MATLAB tool/environment; command mode; script files, arrays, and strings; problem solving structure for MATLAB, algorithms, statements and functions; input, output, plotting; systems and mathematical models.	14.0							
Using C++ for engineering problem solving - Introduction, simple input and output, variables and assignments, selection statements, repetition and loops, file I/O, functions, arrays, pointers, strings, C++ classes.	25.0							
Laboratory exercises drawing from various engineering domains - Fundamental engineering concepts; hands-on experiences with measurement and instrumentation; modeling of engineering systems: collection and analysis of data; reporting of results.			25.0					

Grades

Aspect	Percent
Daily Assignments	22%
Labs Reports	18%
Lab Practical Exam and Lab Quizzes	5%
Short Design Project	5%
Quizzes	8%
Midterms (2)	22%
Final	17%
Electronic Journals	3%

Representative Textbooks and Other Course Materials

Title	Author
Writing as an Engineer (Selected Chaps., Custom Pub, Also used in ENG 1282.0xH)	Beer and McMurrey
Tools and Tactics of Design (Selected Chaps., Custom Pub, Also used in ENG 1282.0xH)	Dominick, Demel, Lawbaugh, Freuler, Kinzel, Fromm
MATLAB, An Introduction with Applications	Gilat
C How to Program	Deitel & Deitel

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
*	c	An ability to design a system, component, or process to meet desired needs.
**	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
*	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Rick Freuler

ENGINEER 1281.02H (Approved): Fundamentals of Engineering for Honors 1 - Advanced Programming

Course Description

Engineering problem solving utilizing computational tools such as Excel and MATLAB; algorithm development; introduction to C++ programming for engineering; hands-on experimentation; modeling; ethics; teamwork; written, oral and visual communications

Prior Course Number: ENGINEER 192.02H
Transcript Abbreviation: Fund Engr Honors 1
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Freshman
Course Offerings: Autumn
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 5.0
Repeatable: No
Time Distribution: 6.0 hr Lec, 2.0 hr Lab
Expected out-of-class hours per week: 7.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq or concur: Engineering Calculus 1. This variant of the course (ENGR 1281.02H) is intended for students who are advanced in computer programming skills. Permission is required. Open only to University-designated Honors students.
Exclusions: Not open to students with credit for ENGR 1181.01 or 1181.02 or CSE 1222 or ENG 191.01 or 191.02.
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: Yes
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: No

Subject/CIP Code: 14.9999
Subsidy Level: Baccalaureate Course

General Information

Engineering problem solving, MATLAB, and C++ are taught. This course is equivalent to the combination of two courses: ENGINEER 1181.0x and CSE/ENGINEER 1222. Students completing this course are considered to have credit for ENGINEER 1181.0x and for CSE/ENGINEER 1222.

Course Goals

Students will develop professional skills for success in engineering, including teamwork; written, oral, and visual communications; and ethics.

Students will understand basic elements for engineering problem solving including developing algorithms and utilizing tools such as Excel and MATLAB.
Students will be competent with writing simple C++ programs using basic C++ constructs, declarations and various program control statements for selection and repetition, and file input and output.
Students will be familiar with C++ functions, arrays, pointers, and C++ classes.
Students will have an introductory knowledge of a wide range of fundamental engineering tasks and principles gained through homework and hands-on laboratory exercises.
Students will be motivated towards opportunities within engineering careers and gain an appreciation of the range of engineering disciplines available to them.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Course introduction and overview.	1.0							
Teamwork fundamentals and team working agreements.	1.5							
Problem solving fundamentals - Problem types, systems descriptions, SI units, significant digits, understanding analysis vs. design.	3.0							
Using spreadsheets for problem solving - Excel spreadsheet structure; equations, operators, array elements; models and systems; mathematical models; plots and charts.	6.0							
Ethics for engineers.	2.0							
Using MATLAB for problem solving - MATLAB tool/environment; command mode; script files, arrays, and strings; problem solving structure for MATLAB, algorithms, statements and functions; input, output, plotting; systems and mathematical models.	14.0							
Using C++ for engineering problem solving - Introduction, simple input and output, variables and assignments, selection statements, repetition and loops, file I/O, functions, arrays, pointers, strings, C++ classes.	25.0							
Laboratory exercises drawing from various engineering domains - Fundamental engineering concepts; hands-on experiences with measurement and instrumentation; modeling of engineering systems: collection and analysis of data; reporting of results.			25.0					

Grades

Aspect	Percent
Daily Assignments	22%
Labs Reports	18%
Lab Practical Exam and Lab Quizzes	5%
Short Design Project	5%
Quizzes	8%
Midterms (2)	22%
Final	17%
Electronic Journals	3%

Representative Textbooks and Other Course Materials

Title	Author
Writing as an Engineer (Selected Chaps., Custom Pub, Also used in ENG 1282.0xH)	Beer and McMurrey
Tools and Tactics of Design (Selected Chaps., Custom Pub, Also used in ENG 1282.0xH)	Dominick, Demel, Lawbaugh, Freuler, Kinzel, Fromm
MATLAB, An Introduction with Applications	Gilat
C How to Program	Deitel & Deitel

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
*	c	An ability to design a system, component, or process to meet desired needs.
**	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
*	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Rick Freuler

ENGINEER 1281.03H (Approved): Fundamentals of Engineering for Honors 1 - Labview

Course Description

Engineering problem solving utilizing computational tools such as Excel and MATLAB; algorithm development; introduction to LabVIEW for engineering; hands-on experimentation; modeling; ethics; teamwork; written, oral and visual communications

Prior Course Number: ENGINEER 192.03H
Transcript Abbreviation: Fund Engr Honors 1
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Freshman
Course Offerings: Autumn
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 5.0
Repeatable: No
Time Distribution: 6.0 hr Lec, 2.0 hr Lab
Expected out-of-class hours per week: 7.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq or concur: Engineering Calculus 1. This variant of the course (ENGR 1281.03H) is intended for students who need or prefer an introduction to LabVIEW. Permission is required. Open only to University-designated Honors students.
Exclusions: Not open to students with credit for ENGR 1181.01, ENGR 1181.02,ENG 191.02, or ENG 191.02.
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: Yes
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: No

Subject/CIP Code: 14.9999
Subsidy Level: Baccalaureate Course

General Information

Engineering problem solving, MATLAB, and LabVIEW are taught.

Course Goals

Students will be motivated towards opportunities within engineering careers and gain an appreciation of the range of engineering disciplines available to them.
Students will develop professional skills for success in engineering, including teamwork; written, oral, and visual communications; and ethics.
Students will understand basic elements for engineering problem solving including developing algorithms and utilizing tools such as Excel and MATLAB.

Students will be competent with writing simple LabVIEW programs using basic LabVIEW constructs, including the programming environment, front panel, block diagram, control, function & tool palettes.
Students will be competent with various program control structures for selection, repetition, timing, tunnels, shift registers, and feedback nodes.
Students will be familiar with LabVIEW virtual instruments, subVIs, arrays, clusters, and strings.
Students will have an introductory knowledge of a wide range of fundamental engineering tasks and principles gained through homework and hands-on laboratory exercises.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Course introduction and overviewl.	1.0							
Teamwork fundamentals and team working agreements.	1.5							
Problem solving fundamentals - Problem types, systems descriptions, SI units, significant digits, understanding analysis vs. design.	3.0							
Using spreadsheets for problem solving - Excel spreadsheet structure; equations, operators, array elements; models and systems; mathematical models; plots and charts.	6.0							
Ethics for engineers.	2.0							
Using MATLAB for problem solving - MATLAB tool/environment; command mode; script files, arrays, and strings; problem solving structure for MATLAB, algorithms, statements and functions; input, output, plotting; systems and mathematical models.	14.0							
Using LabVIEW for engineering problem solving - Introduction, simple input and output, variables, selection statements, repetition and loops, file I/O, functions, arrays, clusters, strings.	25.0							
Laboratory exercises drawing from various engineering domains - Fundamental engineering concepts; hands-on experiences with measurement and instrumentation; modeling of engineering systems: collection and analysis of data; reporting of results.			25.0					

Grades

Aspect	Percent
Daily Assignments	22%
Labs Reports	18%
Lab Practical Exam and Lab Quizzes	5%
Short Design Project	5%
Quizzes	8%
Midterms (2)	22%
Final	17%
Electronic Journals	3%

Representative Textbooks and Other Course Materials

Title	Author
Writing as an Engineer (Selected Chaps., Custom Pub, Also used in ENG 1282.0xH)	Beer and McMurrey
Tools and Tactics of Design (Selected Chaps., Custom Pub, Also used in ENG 1282.0xH)	Dominick, Demel, Lawbaugh, Freuler, Kinzel, Fromm
MATLAB, An Introduction with Applications	Gilat
LabVIEW Student Edition	Bishop

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
*	c	An ability to design a system, component, or process to meet desired needs.
**	d	An ability to function on multi-disciplinary teams.
***	e	An ability to identify, formulate, and solve engineering problems.
*	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
*	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Rick Freuler

ENGINEER 1282.01H (Approved): Fundamentals of Engineering for Honors 2 - Robotics

Course Description

Introduction to 3D visualization and CAD; engineering design-build process; teamwork; written, oral and visual communications; project management. Standard course incorporating a robot design-build project.

Prior Course Number: 193.01H
Transcript Abbreviation: Fund Engr Honors 2
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Freshman
Course Offerings: Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec, 3.0 hr Lab
Expected out-of-class hours per week: 3.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: ENGR 1281.01H or 1281.02H or 1281.03H or permission of instructor. Open only to University-designated Honors students.
Exclusions: Not open to students with credit for ENGR 1182.01 or 1182.02 or 1182.03 or ENG 192.01 or 192.02.
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: Yes
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: No

Subject/CIP Code: 14.9999
Subsidy Level: Baccalaureate Course

General Information

This is the standard version of this course in which the design project is focused on the design, building, and testing of a small autonomous vehicle. Engineering 1281.01H is primarily a design and build project in which students create a working prototype robot. At the beginning of the term, students will be presented with the course scenario and the list of tasks each robot must perform. Using this defined scenario and required tasks, each team of usually four students will design, build, and program a robot that will navigate the course, collect and analyze various external signals, and complete the tasks for which it has been designed. Throughout the course each team will completely document the development of their robot project through formal reports, engineering drawings, and presentations.

Course Goals

Students will understand and gain experience with the elements of engineering design
Students will be able to visualize and present objects and systems in three-dimensions

Student will have a basic proficiency with a modern CAD tool (Autodesk-Inventor)
Students will develop professional skills for success in engineering, including teamwork and written, oral, and visual communications
Students will have an introductory level knowledge of project management (e.g. scheduling, budgeting, reporting)
Students will complete a term-length, design-build project which serves as a cornerstone experience. Project is to reinforce use of engineering problem solving, engineering documentation, graphics and visualization, and teamwork skills.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to Course and Overview	1.0							
Engineering Design Process Fundamentals	2.0							
Visualization of 3-D Objects (Sketching, Pictorials, & Orthographics)	3.0							
Standard Views and Presentations of Objects	6.0							
Construction of 3-D Objects with CAD	10.0							
Conventions and Standards (Dimensioning, Tolerance, Sections)	8.0							
Assembly and Presentation of Systems	5.0							
Project Management	2.0							
Project Documentation	2.0							
Design Project Preparation Exercises			8.0					
Design Project Preliminary Design (Project to make use of both Problem Solving and CAD knowledge)			10.0					
Design Project Final Design (Project to make use of both Problem Solving and CAD knowledge)			25.0					
Written and Oral Presentations	3.0							

Grades

Aspect	Percent
Daily Assignments and Quizes	15%
Lab Memos	5%
Project Milestone Tests & Initial Design	10%
Project Final Test	10%
Oral Presentation	10%
Laboratory Record Notebook	5%
Final Written Report	10%
Midterm Exams	15%
Project deliverables (Project Schedule, Drawings, Diagrams, Flowcharts, Outlines, Progress Reports)	20%

Representative Textbooks and Other Course Materials

Title	Author
An Introduciton to Autodesk Inventor and AutoCAD (Selected Chaps., Custom Pub.)	Shih
Technical Graphics (Selected Chaps., Custom Pub.)	Meyers, Croft, Miller, Demel, Enders
Tools and Tactics of Design (Selected Chaps., Custom Pub., Also used in ENG 1281.0xH)	Dominick, Demel, Lawbaugh, Freuler, Kinzel, Fromm

Title	Author
Writing as an Engineering (Selected Chaps., Custom Pub, Also used in ENG 1281.0xH)	Beer and McMurrey

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
**	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
***	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Rick Freuler

ENGINEER 1282.02H (Approved): Fundamentals of Engineering for Honors 2 - Nanotechnology

Course Description

Introduction to 3D visualization and CAD; engineering design process; teamwork; written, oral and visual communications; project management. Alternative course with an emphasis on a nanotechnology research and development project.

Prior Course Number: 193.02H
Transcript Abbreviation: Fund Engr Honors 2
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Freshman
Course Offerings: Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec, 3.0 hr Lab
Expected out-of-class hours per week: 3.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: ENGR 1281.01H or 1281.02H or 1281.03H or permission of instructor. Open only to University-designated Honors students.
Exclusions: Not open to students with credit for ENGR 1182.01 or 1182.02 or 1182.03 or ENG 192.01 or 192.02.
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.9999
Subsidy Level: Baccalaureate Course

General Information

This course is an alternative to the standard Engineering 1282.01H course. While the 1282.01H robot project is primarily a design and build project, this course is set up as a research and design project in the growing area of micro- and nano-technology. In short, students will be presented with a research hypothesis and then must design and fabricate a "lab-on-a-chip" to perform experiments to test the hypothesis. The lab-on-a-chip will include micro-scale flow channels and nano-scale surface features. In addition to the experimental work, there will be outside-of-class research, extensive use of available software packages for analysis of the lab-on-a-chip's characteristics, and a nano-scale design project. Throughout the course each team will completely document the development of their nano project through formal reports, engineering drawings, and presentations.

Course Goals

Students will understand and gain experience with the elements of engineering design

Students will be able to visualize and present objects and systems in three-dimensions
Student will have a basic proficiency with a modern CAD tool (Autodesk-Inventor)
Students will develop professional skills for success in engineering, including teamwork and written, oral, and visual communications
Students will have an introductory level knowledge of project management (e.g. scheduling, budgeting, reporting)
Students will complete a term-length, research and design project which serves as a cornerstone experience. Project is to reinforce use of engineering problem solving, engineering documentation, graphics and visualization, and teamwork skills.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to Course and Overview	1.0							
Engineering Design Process Fundamentals	2.0							
Visualization of 3-D Objects (Sketching, Pictorials, & Orthographics)	3.0							
Standard Views and Presentations of Objects	6.0							
Construction of 3-D Objects with CAD	10.0							
Conventions and Standards (Dimensioning, Tolerance, Sections)	8.0							
Assembly and Presentation of Systems	5.0							
Project Management	2.0							
Project Documentation	2.0							
Design Project Preparation Exercises			8.0					
Design Project Preliminary Design (Project to make use of both Problem Solving and CAD knowledge)			10.0					
Design Project Final Design (Project to make use of both Problem Solving and CAD knowledge)			25.0					
Written and Oral Presentations	3.0							

Grades

Aspect	Percent
Daily Assignments and Quizes	15%
Lab Memos	5%
Project Milestone Tests & Initial Design	10%
Project Final Test	10%
Oral Presentation	10%
Laboratory Record Notebook	5%
Final Written Report	10%
Midterm Exams	15%
Project deliverables (Project Schedule, Drawings, Diagrams, Flowcharts, Outlines, Progress Reports)	20%

Representative Textbooks and Other Course Materials

Title	Author
An Introduciton to Autodesk Inventor and AutoCAD (Selected Chaps., Custom Pub.)	Shih
Technical Graphics (Selected Chaps., Custom Pub.)	Meyers, Croft, Miller, Demel, Enders

Title	Author
Tools and Tactics of Design (Selected Chaps., Custom Pub., Also used in ENG 1281.0xH)	Dominick, Demel, Lawbaugh, Freuler, Kinzel, Fromm
Writing as an Engineering (Selected Chaps., Custom Pub, Also used in ENG 1281.0xH)	Beer and McMurrey

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
**	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
***	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Rick Freuler

ENGINEER 1282.03H (Approved): Fundamentals of Engineering for Honors 2 - Infrastructure

Course Description

Introduction to 3D visualization and CAD; engineering design process; teamwork; written, oral and visual communications; project management. Alternative course with an emphasis on infrastructure design project or other alternate design project.

Prior Course Number: 193.03H
Transcript Abbreviation: Fund Engr Honors 2
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Undergrad
Student Ranks: Freshman
Course Offerings: Spring
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec, 3.0 hr Lab
Expected out-of-class hours per week: 3.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: ENGR 1281.01H or 1281.02H or 1281.03H or permission of instructor. Open only to University-designated Honors students.
Exclusions: Not open to students with credit for ENGR 1182.01 or 1182.02 or 1182.03 or ENG 192.01 or 192.02.
Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.9999
Subsidy Level: Baccalaureate Course

General Information

This course is an alternative to the standard Engineering 1282.01H course. Depending on the alternative topic, this course may incorporate a project which has a design and build approach, or one which has more of a research and development approach. Throughout the course each team will completely document the development of their alternative project through formal reports, engineering drawings, and presentations.

Course Goals

Students will understand and gain experience with the elements of engineering design
Students will be able to visualize and present objects and systems in three-dimensions
Student will have a basic proficiency with a modern CAD tool (Autodesk-Inventor)

Students will develop professional skills for success in engineering, including teamwork and written, oral, and visual communications
Students will have an introductory level knowledge of project management (e.g. scheduling, budgeting, reporting)
Students will complete a term-length, design project which serves as a cornerstone experience. Project is to reinforce use of engineering problem solving, engineering documentation, graphics and visualization, and teamwork skills.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to Course and Overview	1.0							
Engineering Design Process Fundamentals	2.0							
Visualization of 3-D Objects (Sketching, Pictorials, & Orthographics)	3.0							
Standard Views and Presentations of Objects	6.0							
Construction of 3-D Objects with CAD	10.0							
Conventions and Standards (Dimensioning, Tolerance, Sections)	8.0							
Assembly and Presentation of Systems	5.0							
Project Management	2.0							
Project Documentation	2.0							
Design Project Preparation Exercises			8.0					
Design Project Preliminary Design (Project to make use of both Problem Solving and CAD knowledge)			10.0					
Design Project Final Design (Project to make use of both Problem Solving and CAD knowledge)			25.0					
Written and Oral Presentations	3.0							

Grades

Aspect	Percent
Daily Assignments and Quizes	15%
Lab Memos	5%
Project Milestone Tests & Initial Design	10%
Project Final Test	10%
Oral Presentation	10%
Laboratory Record Notebook	5%
Final Written Report	10%
Midterm Exams	15%
Project deliverables (Project Schedule, Drawings, Diagrams, Flowcharts, Outlines, Progress Reports)	20%

Representative Textbooks and Other Course Materials

Title	Author
An Introduciton to Autodesk Inventor and AutoCAD (Selected Chaps., Custom Pub.)	Shih
Technical Graphics (Selected Chaps., Custom Pub.)	Meyers, Croft, Miller, Demel, Enders
Tools and Tactics of Design (Selected Chaps., Custom Pub., Also used in ENG 1281.0xH)	Dominick, Demel, Lawbaugh, Freuler, Kinzel, Fromm

Title	Author
Writing as an Engineering (Selected Chaps., Custom Pub, Also used in ENG 1281.0xH)	Beer and McMurrey

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
**	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
***	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Prepared by: Rick Freuler