RESOURCES FOR TEACHERS

Taste of Engineering Careers (TEC) Course:
Designing and Building Electric Guitars

Supported by a National Science Foundation Grant

Illinois Valley Community College
Oglesby, IL 61348

March 2010

Table of Contents

TEC COURSE SYLLABUS

ILLINOIS VALLEY COMMUNITY COLLEGE

Course Syllabus

Division: **Career and Technical Programs**
Course: **GNT (General Technology) 1210 -**
Taste of Engineering Careers (TEC)

Date:	March 5, 2010
Semester Hours:	2
Lecture hours per week:	2
Labs hours per week:	2
Seminar hours per week:	0
Other hours:	0
Prerequisite:	
Semester Offered:	Spring / Fall
Instructor(s):	Perez, Gibson, Schwingle, Bias

I. CATALOG DESCRIPTION

The 2 hour Taste of Engineering Class (TEC) utilizes a design project from Purdue University to teach basic technology skills while focusing on a single project from start to finish. In the TEC class students will design and build a guitar.

II. EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

Upon completion of the course, the student will be able to:

1. Analyze the relationship between Music and Physics

Competency 1.1 Calculate frequency and wave length.
Competency 1.2 Given a change in wave length, predict changes in tone.
Competency 1.3 Define resonance.

2. Correctly wire and setup guitar electronics

Competency 2.1 Given a wiring schematic, correctly wire a pickup coil.
Competency 2.2 Install wires and tune a guitar

3. Utilize a CAD tool to design guitar parts.

Competency 3.1 Evaluate current designs.
Competency 3.2 Design parts using CAD.
Competency 3.3 Design parts using 3D CAD.

Competency 3.4 Print out scaled model of parts on 3D printer.
Competency 3.5 Perform a compatibility check.

4. Make Neck and Body Blanks.

Competency 4.1 Evaluate tolerance on neck and body blanks.
Competency 4.2 Evaluate uniformity on neck and body blanks.
Competency 4.3 Make a neck and body to fit design.

5. Use appropriate tools for Material Removal.

Competency 5.1 Safely use the band saw.
Competency 5.2 Safely use scrapers and sanders.

6. Assemble a guitar.

Competency 5.1 Glue fretboards to neck.
Competency 5.2 Install frets.
Competency 5.3 Install wiring harness.

III. COURSE CONTENT:

1 How a guitar works - music, physics
2 Wiring and setup
3 Instrument design, examples of current design
4 Instrument design using CAD tools
5 Finish CAD work, print subscale parts on 3-D printer and check for compatibility
6 Make neck and body blanks, importance of tolerance and uniformity
7 Make neck and body blanks, make fretboards
8 Make neck and body blanks
9 Cut necks and bodies
10 Cut necks and bodies
11 Sand and finish bodies, glue fretboards to necks
12 Sand and finish necks, install frets
13 Wiring harnesses
14 Final assembly and setup
15 Final assembly and setup
16 Measuring build variation, jam session :-)

IV. INSTRUCTIONAL METHOD:

Lecture
Lab
Project based

V. INSTRUCTIONAL MATERIALS:

Parts kit
Lab Manual Perez, Gibson

V. STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

Quizzes	10%
Labs	40%
Attendance	10%
Project completion	40%

90 % - 100%	A
80% - 89.99%	B
70% - 79.99%	C
60% - 69.99%	D
0 % - 59.99%	F

VI. REFERENCES:

Engineering the Guitar, by Richard Mark French

NINE-WEEK TEC COURSE PLAN

Each of the nine TEC course sessions meets for 3 1/2 hours.

Each of the sessions includes:

- Lecture(s), exercise(s), and/or demonstration(s) on STEM topics related to guitar construction
- Laboratory work on guitars

Week	**Lecture – Exercise - Demonstration**	**Laboratory Work on Guitars**
1	• Building a Guitar in CAD and Solid Modeling • The Math and Physics of the Guitar	• Solid Works session in CAD lab • Students receive guitar body and begin hand sanding
2	• Guitar body and neck styles • Importance of uniformity and tolerances	• Student use resources to decide on headstock design • Design their own using CAD
3	• Science and physics behind fret boards	• Sand and finish necks • Glue fret board to neck • Install frets
4	• Guitar electronics: wiring diagrams • Guitar finishes	• Students do setup and wiring • Students complete sanding and finishing
5	• Using Solid Modeling to program tool paths • More on CAD	• Use Solid Works and Mastercam to program CNC machine • Use 3-D printer to subscale parts and check for compatibility
6	• How a guitar works: acoustics	• Finish necks • Cut out head stocks
7	• Assembling a guitar: pickups, strings, tuner, string nut	• Assemble guitars • Check tolerances
8	• Final assembly	• Finish assembly
9	• Measuring build variation • Jam session	• Check tolerances • Tune • Play

- Additional instruction on guitar construction is integrated into the lab work.
- Information on engineering and engineering technology careers and on programs and courses available at IVCC is integrated into nearly all course sessions.

The work done by the students includes:

- finishing the guitar body, customizing the finish and design on the body,
- cutting and finishing the head, customizing it to their preference,
- assembling and soldering the electronics following a schematic,
- installing the electronics,
- assembling the guitar.

The students utilize a variety of software, equipment and tools:

- AutoCAD,
- Solid Works,
- 3-D Printer,
- multimeter,
- electronic tuner,
- fret press, drill press with a plug cutter,
- band saw,
- circular and belt sanders,
- clamps and pins,
- ices,
- files,
- chisels,
- rasps,
- soldering irons,
- cordless drills,
- cordless screw drivers, and
- a number of hand tools.

LAB FACILITES AND EQUIPMENT NEEDED

- Tables for sanding, painting, soldering
- Space to hang guitars while paint dries
- Classroom with computers - Internet, AutoCAD, SolidWorks
- Multimeter
- Electronic tuner
- Fret press
- Sanders,
- band saw,
- clamps,
- pins,
- vices,
- files,
- chisels,
- rasps,
- soldering irons,
- drills,
- screw drivers,
- various hand tools.
- 3-D Printer, optional

SOURCES FOR FACULTY TRAINING

Dorene Perez, Program Coordinator CAE/CAD
dorene_perez@ivcc.edu
815-224-0221
James Gibson, Program Coordinator of Electronics
jim_Gibson@ivcc.edu
815-224-0453
Illinois Valley Community College
815 North Orlando Smith Ave.,
Oglesby, IL 61348
www.ivcc.edu/nsf

Mechanical Engineering Technology Acoustics Lab
(METAL)
Purdue University
http://metalsound.tech.purdue.edu

SOURCES FOR GUITAR COMPONENTS

Mechanical Engineering Technology Acoustics Lab
(METAL)
Purdue University
http://metalsound.tech.purdue.edu

National Center for Manufacturing Education
(NCME Storefront)
Sinclair Community College
http://ncmestorefront.mybisi.com

TEC COURSE INFORMATION SHEET

Taste of Engineering Careers (TEC) Course

GNT 1210 – Illinois V alley Community College – 2 sem. hours

The Taste of Engineering Careers Course focuses on engineering technology skills with a single project – designing and building an electric guitar. Each student will design and construct a guitar, which becomes the property of the student upon successful completion of the course.

Course Credit: 2 semester hours (IVCC credit hours)

Course Eligibility: Open to LaSalle-Peru High School and Area Career Center seniors by application. Juniors may be eligible in special circumstances. Since this course is supported by a National Science Foundation grant and only 10 seats are available, applications will be evaluated on the basis of the goal/objectives of the NSF grant, the quality of responses on the application and the individual's potential for success in a technical/technology-related project.

Tuition: Free. IVCC tuition of $139.50 for 2 credit hours plus a $5 registration fee and $100 of the cost of guitar components are supported by a National Science Foundation grant.

Fee: $75 to be paid to IVCC by the student before the first course session. This fee covers the portion of the cost of guitar components not funded through the NSF grant.

Schedule: The course will meet on nine Saturdays: October 3 to Dec. 5, 2009 (does not meet Nov. 28) from 8 a.m. to noon in the Agriculture Building on the IVCC East Campus.

Course Content:

- How a guitar works : music and physics
- Wiring and setup
- Instrument design, using CAD tools
- Neck and body blanks: Tolerance, uniformity
- Fretboards
- Sanding and finishing
- Wiring harnesses
- Assembly and setup
- Measuring build variation

Instructors: Dorene Perez, Program Coordinator of CAD; Jim Gibson, Program Coordinator of Electronics; Tim Bias, Program Coordinator of Manufacturing/Industrial Maintenance

FOR FURTHER INFORMATION contact: Dorene Perez, Illinois Valley Community College, 815 North Orlando Smith Ave., Oglesby, IL 61348. Phone: 815-224-0221. Email: dorene_perez@ivcc.edu

Or visit www.ivcc.edu/nsf

National Science Foundation Grant #0802505

Building an Engineering Technology Workforce:

A Plan for Reaching Young People, Adults and Women

Illinois Valley Community College

2008 - 2011

Goal and Objectives

The goal of Building An Engineering Technology Workforce is to increase the number of people in the Illinois Valley Community College district who prepare to enter engineering and engineering technology careers. This project targets high school and middle school students and adults (non-traditional students), with specific efforts directed at women. The objectives of project activities are:

- To increase awareness of and interest in engineering and engineering technology careers, with special emphasis on the work of engineering technicians.
- To assist in preparing students to enter engineering and engineering technology programs by integrating science, technology and math into project activities
- To increase enrollment in engineering technology programs at IVCC.

Further information about the grant project is available at **www.ivcc.edu/nsf** and from the grant project staff:

Project Principal Investigator:
Dorene Perez, dorene_perez@ivcc.edu
Co-Principal Investigators:
Jim Gibson, jim_gibson@ivcc.edu;
Sue Caley Opsal, sue_caley@ivcc.edu;
Rose Marie Lynch, rosemarie_lynch@ivcc.edu

APPLICATION FORM
Application for Taste of Engineering Careers (TEC) Course

GNT 1210 – Illinois V alley Community College

Name ________________________________ Male_____ Female _____
Address___________________________________ City ___________________
Parent/Guardian Name(s) ____
Phone number ____________________________
Email address (please print carefully) ___________________________________

Current high school courses :

Previous courses/training/experience in drafting/computer aided design, electronics/electricity, math, science or music:

My plans after high school are to:

My career plans are to:

Why would you like to enroll in the Taste of Engineering Careers Course at Illinois Valley Community College? What are your goals, what do you hope to learn? (Please write a minimum of 50 words on the back or attach a separate page.)

- -

I.V.C.C. tuition and a portion of fees for the Taste of Engineering Careers Course are being funded through a National Science Foundation grant. Students selected for the course will need to pay a $75 fee to partially cover the costs of guitar parts.

If selected, I agree to attend all nine class sessions: Saturday mornings Oct. 3 – Dec. 5 (does not meet on Nov. 28) on the IVCC campus

__________________________________ ________________
(Student Signature) (date)

If my child/ward is selected for the course, I understand that he/she must attend all nine class sessions (Saturday mornings Oct 3 – Dec. 5 (does not meet on Nov. 28) in order to successfully complete the course.

___________________________________ __ ____________
(Parent/Guardian Signature) (date)

Please submit this application by Sept. 15, 2009 to Dorene Perez, Illinois Valley Community College, 815 North Orlando Smith Ave., Oglesby, IL 61348. Email: dorene_perez@ivcc.edu

APPLICATION EVALUATION RUBRIC

TEC Course Fall 2009

Application Number _____ **Total Points _____**

_____ Female **_____ Male**

	Excellent 3	Average 2	Poor 1
Strong: (check which apply, but only one score from this background category) **Math background _____** **Science background _____** **CAD background _____** **Electronics background _____** **Other technical background _____**			
Strength of statement			
Meets goal of grant project: **Potential for technical / technology program / career**			

Evaluator _____

SAMPLE CONSENT FORMS

Parent Permission Letter

[On IVCC letterhead]
[Attach one page summary of grant]

Dear Parent

Ware conducting a study to determine the interest level and effectiveness of activities we are offering as part of a project funded by the National Science Foundation and titled "Building An Engineering Technology Workforce." Your child or ward will be asked to complete surveys indicating what he/she thought of the activity(ies) and of engineering as a career.

There are no risks to your child or ward. Survey responses will be confidential and no one will be able to identify your child or ward when the results are reported. Your child/ward will not be identified individually; no one will know who filled out the survey, and all surveys will be anonymous. Participation is completely voluntary. There is no penalty for not participating in the survey and your child/ward will not be identified whether they participate or not. They have the right to refuse to complete any, all, or part of the survey without identification or penalty.

Results of this anonymous, voluntary survey may be reported to the National Science Foundation and disseminated as part of the project.

If you have any questions about this study, please contact Dorene Perez, Program Coordinator of CAD/CAE at Illinois Valley Community College (815-224-0221). Or, for other questions, contact the Director Institutional Research at IVCC (815-224-0540).

Sincerely

Dorene Perez
Principal Investigator of NSF Grant
Program Coordinator of CAD/CAE

- -

I understand the study described above and have been given a copy of the description of the project outlined above. I agree to allow my child/ward to participate with his/her assent when possible.

Signature____ Date ______________

Print Name:______________________________________

Student name ____________________________________

Student Permission Letter - Student under 18

[On IVCC letterhead]

Dear student

We are conducting a study to determine the interest level and effectiveness of activities we are offering as part of a project funded by the National Science Foundation and titled "Building An Engineering Technology Workforce."

We will be asking you to complete a survey(ies) indicating what you thought of the activity and of engineering. Your survey responses will be confidential. You will not be identified individually; no one will know who filled out the survey, and all surveys will be anonymous. Participation is completely voluntary. There is no penalty for not participating in the survey and you will not be identified whether you participate or not. You have the right to refuse to complete any, all, or part of the survey without identification or penalty.

Results of this anonymous, voluntary survey may be reported to the National Science Foundation and disseminated as part of the project.

If you have any questions about this study, please contact Dorene Perez, Program Coordinator of CAD/CAE at Illinois Valley Community College (815-224-0221). Or, for other questions, contact the Director Institutional Research at IVCC (815-224-0540).

Sincerely

Dorene Perez
Principal Investigator of NSF Grant
Program Coordinator of CAD/CAE

- -

I understand what I must do in this study and I want to take part in the study.

Participant's signature____________________________________

Print Name:____

Date:_____________

Adult Permission Letter - 18 or older

[On IVCC letterhead]
[Attach one page grant summary]

We are conducting a study to determine the interest level and effectiveness of activities we are offering as part of a project funded by the National Science Foundation and titled "Building An Engineering Technology Workforce."

We will be asking you to complete a survey indicating what you thought of the activity. Your survey responses will be confidential. You will not be identified individually; no one will know who filled out the survey, and all surveys will be anonymous. Participation is completely voluntary. There is no penalty for not participating in the survey and you will not be identified whether you participate or not. You have the right to refuse to complete any, all, or part of the survey without identification or penalty.

Results of this anonymous, voluntary survey may be reported to the National Science Foundation and disseminated as part of the project.

If you have any questions about this study, please contact Dorene Perez, Program Coordinator of CAD/CAE at Illinois Valley Community College (815-224-0221). Or, for other questions, contact the Director Institutional Research at IVCC (815-224-0540).

Sincerely

Dorene Perez
Principal Investigator of NSF Grant
Program Coordinator of CAD/CAE

- -

I understand the study described above and have been given a copy of the description of the project as outlined above. I am 18 years of age or older and I agree to participate.

Participant's signature_____________________________________

Print Name:____

Date:_____________

Faculty / Counselor / Staff Consent Letter for Attitude Survey

[On IVCC letterhead]
[Attach one page grant summary]

We are conducting a study of awareness of and attitudes about engineering as part of a project funded by the National Science Foundation and titled "Building An Engineering Technology Workforce," grant #0802505.

We will be asking you to complete a survey indicating what you think. Your survey responses will be confidential. You will not be identified individually; no one will know who filled out the survey, and all surveys will be anonymous. Participation is completely voluntary. There is no penalty for not participating in the survey and you will not be identified whether you participate or not. You have the right to refuse to complete any, all, or part of the survey without identification or penalty.

Results of this anonymous, voluntary survey may be reported to the National Science Foundation and disseminated as part of the project.

If you have any questions about this study, please contact Dorene Perez, Program Coordinator of CAD/CAE at Illinois Valley Community College (815-224-0221). Or, for other questions, contact the Director of Institutional Research at IVCC (815-224-0540).

Sincerely

Dorene Perez
Principal Investigator, NSF Grant
Program Coordinator of CAD/CAE

- -

I understand the study described above and have been given a copy of the description of the project as outlined above. I am 18 years of age or older and I agree to participate.

Participant's signature______________________________________

Print Name:____

Date:______________

Photo Release Forms for Underage Students

ILLINOIS VALLEY COMMUNITY COLLEGE

Photo/Video Statement Release –

Parent/Guardian Consent Form

I consent to my child (or ward's) photographs, video and statements taken by Illinois Valley Community College being used in possible promotional or educational materials, including IVCC's Web site.

Parent/Guardian Printed Name _____

Parent/Guardian Signature_____

Child/Ward's Name _____Date_____

Any questions regarding this consent can be directed to Dorene Perez, Illinois Valley Community College, 815 North Orlando Smith Ave., Oglesby, IL 61348. Phone: 815-224-0221.

ILLINOIS VALLEY COMMUNITY COLLEGE

Photo/Video Statement Release

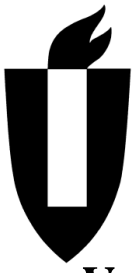
Student Consent Form

I hereby release rights to photographs, video and statements taken by Illinois Valley Community College to use in possible promotional or educational materials, including IVCC's Web site.

Student Signature_____

Date_____

Any questions regarding this consent can be directed to Dorene Perez, Illinois Valley Community College, 815 North Orlando Smith Ave., Oglesby, IL 61348. Phone: 815-224-0221.



ILLINOIS VALLEY COMMUNITY COLLEGE

Photo/Video Statement Release

For Parent/Guardian's Photo/Statements

I hereby release rights to photographs, video and statements taken by Illinois Valley Community College to use in possible promotional or educational materials, including IVCC's Web site.

Signature_____Date_____
(parent/guardian)

Photo Release Form for Adult

Photo/Video Statement Release

I hereby release rights to photographs, video and statements taken by Illinois Valley Community College to use in possible promotional or educational materials, including IVCC's Web site.

ILLINOIS VALLEY COMMUNITY COLLEGE

Signature_____Date_____

SAMPLE ASSESSMENTS

TEC Course (Guitar) Student – Pre Survey

[Survey fits on one page]

HEADER:

National Science Foundation Project: Building an Engineering Technology Workforce. #0802505
Illinois Valley Community College, Oglesby, IL www.ivcc.edu/nsf
Contact: Dorene Perez, Principal Investigator, 815-224-0221, Email: dorene_perez@ivcc.edu
Results of this anonymous, voluntary survey may be reported to the NSF and disseminated as part of the project.

Please place a check mark in the boxes below for your response to the following statements.

		Strongly agree	Agree	Unsure/ no opinion	Disagree	Strongly disagree
1	I believe engineering is a good career for a woman.					
2	I believe engineering is a good career for a man.					
3.	Women can be as good as men in math and science.					
4.	Engineers often demonstrate creativity.					
5	Engineers need to have good communication skills					
6	Engineers need to work well with people and be good team players.					
7	Engineers must have good math skills					
8	Engineers must have a good background in science.					
9	I believe engineers make meaningful and important contributions to our lives.					
10	I believe engineering is “cool.”					
11	Math is fun					
12.	Science is fun.					
13.	I feel confident about my technical skills.					
14.	I have thought about a career as an engineer or engineering technician					

15.	I am planning a career as an engineer or engineering technician.					
16.	A teacher/counselor(s) has suggested I consider a career as an engineer or engineering technician.					
17.	My parent(s) have suggested I consider a career as an engineer or engineering technician.					

18. Are you aware of the difference between the work of engineers and engineering technicians? _____ Yes _____ No

19. Are you aware that IVCC offers programs in engineering and industrial engineering technology that transfer to four-year colleges? _____ Yes _____ No

20. Are you aware that IVCC offers two-year career degrees in computer-aided engineering and design and in electronics technology that lead to employment?
_____ Yes _____ No

21. Are you _____ Male _____ Female

22. Are you _____ Junior ____ Senior

23. Comments:

TEC Course (Guitar) Student – Post Survey

[Survey fits on one page]

HEADER:

National Science Foundation Project: Building an Engineering Technology Workforce. #0802505
Illinois Valley Community College, Oglesby, IL www.ivcc.edu/nsf
Contact: Dorene Perez, Principal Investigator, 815-224-0221, Email: dorene_perez@ivcc.edu
Results of this anonymous, voluntary survey may be reported to the NSF and disseminated as part of the project.

Please place a check mark in the boxes below for your response to the following statements.

		Strongly agree	Agree	Not sure- No opinion	Disagree	Strongly disagree
1.	Engineers often demonstrate creativity.					
2.	As a result of this TEC course, I have a better understanding or appreciation of the creativity in engineering.					
3.	Engineers need to work well with people and be good team players.					
4.	As a result of this TEC course, I have a better understanding or appreciation of the teamwork in engineering.					
5.	Engineers must have good math skills					
6.	Math is fun or interesting					
7.	As a result of this TEC course, I have a better understanding or appreciation of practical applications of math.					
8	Engineers must have a good background in science.					
9.	Science is fun or interesting					
10	As a result of this TEC course, I have a better understanding or appreciation of practical applications of science.					
11.	I feel confident about my technical skills.					
12.	This course helped me improve my technical skills.					

13. Match the words with the definitions below:

_____a. Engineer
_____b. Engineering Technician

1. Work is hands-on – emphasis on practical applications. Typically requires a 2-year degree.
2. Designs structures, machines, systems, etc. More theoretical. Typically requires a 4-year degree

14. As a result of this TEC course, I am
_____ More likely to pursue a career in an engineering or engineering technology field
_____ Less likely to pursue a career in an engineering or engineering technology field
_____ No change in my career attitudes and intentions.

15. My current plans are to pursue a career in _____

16. As a result of this TEC course, I am
_____ More likely to attend IVCC
_____ Less likely to attend IVCC
_____ No change in my attitude toward IVCC

17. I plan to enroll at _____ after high school graduation
(name of college or technical school)

18. Are you aware that IVCC offers programs in engineering and industrial engineering technology that transfer to four-year colleges? _____ Yes _____ No

19. Are you aware that IVCC offers two-year career degrees in computer-aided engineering and design and in electronics technology that lead to employment? _____ Yes _____ No

20. Are you _____ Junior ____ Senior

21. Comments:

TEC Course (Guitar) Parent – Pre Survey

[Survey fits on one page]

HEADER:

National Science Foundation Project: Building an Engineering Technology Workforce. #0802505
Illinois Valley Community College, Oglesby, IL www.ivcc.edu/nsf
Contact: Dorene Perez, Principal Investigator, 815-224-0221, Email: dorene_perez@ivcc.edu
Results of this anonymous, voluntary survey may be reported to the NSF and disseminated as part of the project.

Please place a check mark in the boxes below for your response to the following statements.

		Strongly agree	Agree	Unsure/ no opinion	Disagree	Strongly disagree
1.	Engineering is a good career for a woman.					
2.	Engineering is a good career for a man.					
3.	Women can do as well as men in math and science.					
4.	Engineers need to be creative.					
5.	Engineers need to have good communication skills					
6.	Engineers need to work well with people and be good team players.					
7.	Engineers must have good math skills					
8.	Engineers must have a good background in science.					
9.	Engineers make a big contribution to our lives.					
10.	Engineers are “cool.”					
11.	There are good career opportunities available for engineering / engineering technology graduates					
12.	Engineering talent is in short supply in the U.S. today.					

13. Have you suggested an engineering career to your daughter(s)?
_____ Yes _____ No _____ Not applicable

14. Have you suggested an engineering career to your son(s)?
_____ Yes _____ No _____ Not applicable

15. Are you aware of the difference between the work of engineers and the work of engineering technicians? _____ Yes _____ No
_____Somewhat

16. Are you aware that IVCC offers transfer programs in engineering and industrial engineering technology? _____ Yes _____ No

17. Are you aware that IVCC offers two-year career degrees in computer-aided engineering and design and in electronics technology? _____ Yes
_____ No

18. Are you _____ Male _____ Female

19. Your highest education level ____ did not complete high school ____high school
____ some college ____ 4-year college degree ____ advanced degree

20. Comments:

TEC Course (Guitar) Parent – Post Survey

[Survey fits on one page]

HEADER:

National Science Foundation Project: Building an Engineering Technology Workforce. #0802505

Illinois Valley Community College, Oglesby, IL www.ivcc.edu/nsf
Contact: Dorene Perez, Principal Investigator, 815-224-0221, Email: dorene_perez@ivcc.edu

Results of this anonymous, voluntary survey may be reported to the NSF and disseminated as part of the project.

Please place a check mark in the boxes below for your response to the following statements.

		Strongly agree	Agree	Not sure- No opinion	Disagree	Strongly disagree
1.	Engineers often demonstrate creativity.					
2.	As a result of my son/daughter taking the TEC course, I have a better understanding or appreciation of the creativity in engineering.					
3.	Engineers need to work well with people and be good team players.					
4.	As a result of my son/daughter taking the TEC course, I have a better understanding or appreciation of the teamwork in engineering.					
5.	Engineers must have good math skills					
6.	As a result of my son/daughter taking the TEC course, I have a better understanding or appreciation of practical applications of math.					
7.	Engineers must have a good background in science.					
8	As a result of my son/daughter taking the TEC course, I have a better understanding or appreciation of practical applications of science.					
9.	There are good career opportunities available for engineering / engineering technology graduates.					
10	Engineering talent is in short supply in the U.S. today.					

17. Match the words with the definitions below:

_____a. Engineer

_____b. Engineering Technician

3. Work is hands-on – emphasis on practical applications. Typically requires a 2-year degree.
4. Designs structures, machines, systems, etc. More theoretical. Typically requires a 4-year degree

18. Since your son/daughter enrolled in the TEC course, have you discussed an engineering career with your daughter(s)?
_____ yes _____ no _____not applicable

19. Since your son/daughter enrolled in the TEC course, have you discussed an engineering career with your son(s)?
_____ yes _____ no _____ not applicable

16. Are you aware that IVCC offers programs in engineering and industrial engineering technology that transfer to four-year colleges? _____ Yes _____ No

17. Are you aware that IVCC offers two-year career degrees in computer-aided engineering and design and in electronics technology that lead to employment? _____ Yes _____ No

18. Are you _____ Male ____ Female

19. Your highest education level:
_____ did not complete high school
_____ high school
_____ some college
_____ associate degree
_____ 4-year college degree
_____ advanced degree

20. Comments:

Teacher / Counselor / Staff Attitude & Awareness Survey

[Survey fits on a legal size page]

HEADER:

National Science Foundation Project: Building an Engineering Technology Workforce. #0802505
Illinois Valley Community College, Oglesby, IL www.ivcc.edu/nsf
Contact: Dorene Perez, Principal Investigator, 815-224-0221, Email: dorene_perez@ivcc.edu
Results of this anonymous, voluntary survey may be reported to the NSF and disseminated as part of the project.

Engineering Career Survey

Please place a check mark in the boxes below for your response to the following statements and add any comments you would like to make.

		Strongly agree	Agree	Unsure/ no opinion	Disagree	Strongly disagree
1	Engineering is a good career for a woman.					
2	Engineering is a good career for a man.					
3	Engineers need to be creative.					
4	Engineers need to have good communication skills					
5	Engineers need to work well with people and be good team players.					
6	Engineers must have good math skills					
7	Engineers must have a good background in science.					
8	Engineering exercises can help students understand math and science concepts.					
9	Engineers make a big contribution to our lives.					
10.	Engineers are “cool.”					

11. Are you aware of the difference between the work of engineers and engineering technicians? _____ Yes _____ No

12. Are you aware that IVCC offers transfer programs in engineering and industrial engineering technology? _____ Yes _____ No

13. Are you aware that IVCC offers two-year career degrees in computer-aided engineering and design and in electronics technology? _____ Yes _____ No

14. Are you _____ Male _____ Female

15. Are you ____ Counselor ____ Faculty ____ Administrator ____ Other _____
(job title-area)

IF FACULTY, please check your department and respond to the statements below:

16. _____ Area Career Center
_____ Career and Technical Education
_____ English
_____ Math
_____ Social Science
_____ Business & Family Consumer Sci.
_____ Driver's Ed., Health & Physical Ed.
_____ Foreign Language, Music & Art
_____ Science
_____ Special Education

17.	My students believe engineers are "cool."	Strongly agree	Agree	Unsure, no opinion	Disagree	Strongly disagree
18.	The approximate percentage of my students interested in becoming engineers is	0%	10%	25%	50%	75% or more

19. Comments:

SAMPLE PUBLICITY RELEASE

NSF Grant Activities
Fall 2009

Illinois Valley Community College is offering collaborative efforts with area high schools and junior high schools to encourage more young people to consider engineering-related careers.

Current activities, supported by a $520,000 grant from the National Science Foundation, include:

- A Taste of Engineering Careers (TEC) course for IVCC credit in which high school juniors and seniors experience various engineering fields as they build an electric guitar. Each student will take home the guitar they build. The course is being pioneered with students at LaSalle-Peru High School and the Area Career Center this fall and will expand to other high schools.
- A Tech Club for high school students in which members develop leadership and teamwork skills. Activities include field trips, speakers, hands-on projects and affiliation with the state and national Technology Student Association. A Tech Club was organized at LaSalle-Peru High School last spring and one is being organized at Ottawa High School this fall.
- A camp for middle school girls meeting weekly in Ottawa to engage the young women in hands-on science, technology, engineering and math exercises.

"We want young people to understand the impact engineers have on everything around us and to experience what its really like to be an engineer or engineering technician," said Dorene Perez, the director of the grant and program coordinator of Computer Aided Engineering and Computer Aided Design at IVCC.
Upcoming events include working with the Girl Scouts on engineering-related badges, an inventor's camp for students at Shepherd Junior High in Ottawa, an engineering poster contest for junior high and high school students, a tea for promising high school women, and an Edible Car Contest at IVCC.

During the summer, 12 students from Lincoln Junior High School in LaSalle participated in the Challenger Learning Center camp headquartered in Bloomington, Ill.
To reach adults who may be seeking career changes, informational and promotional materials about engineering technology are being developed.

Further information about the grant activities is available from Dorene Perez, program coordinator of computer aided engineering/computer aided design, who heads the grant project as Principal Investigator. Email dorene_perez@ivcc.edu or call 815-224-0221.

Other IVCC staff members on the NSF grant team are Jim Gibson, program coordinator of electronics; Sue Caley Opsal, anatomy and physiology instructor; Rose Marie Lynch, communications instructor; Jeanette Maurice, work-based learning coordinator for the Education for Employment Office; Tracy Morris, director of admissions and records; and Francie Skoflanc, program coordinator of graphic arts. Dawn, Wiggins, mathematics instructor, is leading the middle school girls' camp in Ottawa.

TEC COURSE CONTACT INFORMATION

Dorene Perez, Program Coordinator of CAE/CAD, Illinois Valley Community College, 815 North Orlando Smith Ave., Oglesby, IL 61348
dorene_perez@ivcc.edu 815-224-0221

James Gibson, Program Coordinator of Electronics, Illinois Valley Community College, 815 North Orlando Smith Ave., Oglesby, 61348
jim_gibson@ivcc.edu 815-224-0453

National Science Foundation Grant #0802505 "Building An Engineering Technology Workforce: A Plan for Reaching Young People, Adults and Women"

PRINCIPAL INVESTIGATORS:

Dorene Perez, Program Coordinator of CAE/CAD, Principal Investigator
dorene_perez@ivcc.edu

James Gibson, Program Coordinator of Electronics, co-Principal Investigator
jim_Gibson@ivcc.edu

Sue Caley Opsal, Anatomy & Physiology Professor, co-Principal Investigator
sue_caleyopsal@ivcc.edu

Rose Marie Lynch, Communications Instructor, co-Principal Investigator
rosemarie_lynch@ivcc.edu

SENIOR PERSONNEL:

Jeanette Maurice, Grant Coordinator for Starved Rock Associates for Vocational and Technical Education
jeanette_maurice@ivcc.edu

Tracy Morris, Director of Admissions and Records
tracy_morris@ivcc.edu

Francie Skoflanc, Program Coordinator of Graphic Design
francie_skoflanc@ivcc.edu

INTERNAL EVALUATOR:

Kaushalya Jagasia, Professor of English
koshu_jagasia@ivcc.edu

NSF GRANT PROJECT WEB SITE: **http://www.ivcc.edu/nsf**

NSF GRANT PROJECT SUMMARY

Building an Engineering Technology Workforce: A Plan for Reaching Young People, Adults and Women

National Science Foundation Grant # 0802505, $520,000 for 2008-2011
Illinois Valley Community College, Oglesby, IL 61348
Principal Investigator: Dorene Perez, dorene_perez@ivcc.edu 815-224-0221
Co-Principal Investigators: Jim Gibson, Sue Caley Opsal, Rose Marie Lynch
Senior Personnel: Jeanette Maurice, Francie Skoflanc, Tracy Morris

Grant Project Summary

"Building an Engineering Technology Workforce: A Plan for Reaching Young People, Adults and Women" is a comprehensive recruiting project designed to increase the number of people who prepare to enter engineering and engineering technology careers in the Illinois Valley Community College district. The objectives of the project are:

- To increase awareness of and interest in engineering and engineering technology careers, with special emphasis on the work of engineering technicians.
- To assist in preparing students to enter engineering programs by integrating science, technology, engineering and math (STEM) into activities.
- To increase enrollment in engineering technology programs at IVCC.

Grant initiatives address the barriers that prevent each of the target groups from selecting engineering careers:

- for young people the major barrier is perceived difficulty;
- for adults the major barrier is lack of awareness of engineering career benefits;
- for women the major barrier is the perception of engineering as not feminine and not relevant to their lives.

Major project activities include:

(1) Project-based short-term events to interest a broad base of young people,
(2) Project-based camps for middle school students and young women,
(3) High school engineering technology clubs,
(4) A Taste of Engineering Careers (TEC) course, focused on building a guitar, for IVCC credit to high school juniors and seniors.
(5) A Leadership Team for high school students,

(6) Exciting special projects for high school students,
(7) Promotional materials targeting young people, parents, adults, women
(8) Publicizing successes of participants in area media.

Project activities that target young people are being offered in a sequence to create and build interest in and commitment to careers in engineering technology. The sequence starts with short-term special events offered to a broad base of students at middle schools and high schools. At the middle school level, the next step is to offer inventor's camps. At the high school level, tech clubs are being organized to provide opportunities for hands-on projects. The next step for high school juniors and seniors is a Taste of Engineering Careers course for IVCC credit, and finally, creating a Leadership Team for promising high school students, modeled after the highly successful team at IVCC.

www.ivcc.edu/nsf