Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: **Innovation and Invention**

Course Number: 00755

Course Description and Prerequisites:

Innovation and Invention helps students develop critical thinking and problem solving skills. Innovation and Invention integrates the technological problem solving method with knowledge of science, mathematics, communications and other disciplines. It provides students with opportunities to research, design, develop, build, test and evaluate solutions to real life problems related to meeting human needs and wants. Content is drawn from bio-related, physical and information technology, however each student or group will focus on those areas that match their goals. Emphasis is placed on documenting and presenting the research during various stages of the process. This capstone course may be used to satisfy a student's senior project or community project. Projects beyond course expectations may require a materials fee.

Final Required

Prerequisite: Technological Design and Systems

Suggested Grade Level: 11th – 12th

Length of Course: X One Semester X Two Semesters _____Other

Units of Credit: ½ or 1

PDE *Certification and Staffing Policies and Guidelines (CSPG)* Required Teacher Certification(s) Technology Education CSPG#65

Certification verified by WCSD Human Resources Department:
X Yes ____No

Board Approved Textbooks, Software, Materials:
Title:
Publisher:
ISBN #:
Copyright Date:
Date of WCSD Board Approval:

BOARD APPROVAL:

Date Written: 10/9/06

Date Approved: _____

Implementation Year: 2007-2208

Suggested Supplemental Materials: Contingent on the student's focus area.

Course Standards

PA Academic Standards:

3.1.12.A Unifying Themes
3.2.12.D Inquiry and Design
3.6.12. (A,B,C) Technology Education
3.7.12. (A,D) Technology Devices
3.8.12. (A,B,C) Science, Technology and Human Endeavors

WCSD Academic Standards: None

Industry or Other Standards: None

WCSD EXPECTATIONS

WCSD K-12 Expectations for instruction in writing, reading, mathematics and, technology have been developed and revised annually. The teacher will integrate all WCSD Expectations into this planned instruction

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (I.E.P.) or Gifted Individual Education Plan (G.I.E.P.).

SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND ELIGIBLE CONTENT WHERE APPLICABLE

3.1.12 A Unifying Themes x-performance assessed during that semester

	Performance Indicator	1	2	Assessment
A.	Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project

3.2.12.D Inquiry and Design

	Performance Indicator	1	2	Assessment
D.	Analyze and use the technological design process to solve problems.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project

3.6.12.(A,B,C) Technology Education

	Performance Indicator	1	2	Assessment
A.	Analyze biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding.			
C.	Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.			

3.7.12 (A,D) Technology Devices

	Performance Indicator	1	2	Assessment
A.	Apply advanced tools, materials and techniques to answer complex questions.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
D.	Evaluate the effectiveness of computer software to solve specific problems.			

3.8.12 (A,B,C) Science, Technology and Human Endeavors

	Performance Indicator	1	2	Assessment
A.	Synthesize and evaluate the interactions and constraints of science and technology on society.			Formative Assessments: • Peer Assessment • Quizzes • Teacher Observation Summative Assessment: • Documentation / Portfolio • Project
B.	Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.			
C.	Evaluate the consequences and impacts of scientific and technological solutions.			

ASSESSMENTS

PSSA Assessment Anchors Addressed: The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at pde@state.pa.us.

Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

Portfolio Assessment: _X_ Yes ____ No

District-wide Final Examination Required: _X_ Yes ____ No

Course Challenge Assessment:
Written Test(s)
Performance Assessment(s)

REQUIRED COURSE SEQUENCE AND TIMELINE

Content Sequence	Dates	
	18 week (Semester)	36 week (Year)
Safety	1 week	1 week
Presenting (during and final)	1 week	2 weeks
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Design	8 weeks	17 weeks
Engineering Principles (as needed)	4 weeks	8 weeks
Optimization	1 week	2 weeks
Technological/Societal Interaction	2-3 days	1 week
Ethical and Legal Responsibilities	2-3 days	1 week
Careers in Design and Engineering	2-3 days	1 week
Historical Antecedents and Future Trends	2-3 days	1 week

Objectives:

1. Demonstrate positive safety attitudes and behaviors throughout the design engineering process.
2. Provide periodic update presentations about the project and the technological method employed throughout the various processes.
3. Review and differentiate between open loop and closed loop systems through developing, producing, using, and assessing technological control systems.
4. Demonstrate an understanding of the design process that includes: framing design briefs, selecting problem solving strategies, design execution, materials testing, research, prototyping, and testing.
5. Appropriately document all phases of the design process as assigned, and present the process at various stages including a final exhibition and presentation.
6. Review and utilize the laws, principles and phenomena that describe engineering systems and synthesize working models of engineered systems.
7. Explain and utilize decision-making strategies commonly used by engineers including: optimization, trade-offs, break-even analysis and risk assessment.
8. Describe how technology and society interact. Specifically, assess technological impacts of the design problem and make decisions based upon the assessments.
9. Follow ethical and legal guidelines when designing and engineering products, processes and systems.
10. Investigate various careers involved in the design-engineering field.
11. Identify historical antecedents to the design problem and potential future trends.
12. Present information in a clear, informative and concise manner.

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WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? _X_ Yes ____ No
2. Does this course issue a mark/grade for the report card?

   _X_ Yes____ No
3. Does this course issue a Pass/Fail mark? ____ Yes _X_ No
4. Is the course mark/grade part of the GPA calculation?

   _X_ Yes ____ No
5. Is the course eligible for Honor Roll calculation? _X_ Yes ____ No
6. What is the academic weight of the course?

   ____ No weight/Non credit _X_ Standard weight

   ____ Enhanced weight (Describe)_____