

**DEPARTMENT OF INDUSTRY AND TECHNOLOGY  
BALL STATE UNIVERSITY  
Muncie, Indiana**

**ITEDU 410 — CAPSTONE EXPERIENCE IN TECHNOLOGY  
Course Syllabus**

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**I. Course Title:** ITEDU 410 CAPSTONE EXPERIENCE IN TECHNOLOGY (3 cr hrs)

**II. Prerequisites:** Junior Standing

**III. Catalog Description:**

**CAPSTONE EXPERIENCE IN TECHNOLOGY (ITEDU — 3 CR HRS)** A

technological product, process, or system is studied. Students conduct in-depth research on an approved topic related to technology. Results of the research are formally presented to peers and faculty.

**IV. Texts and/or Resources:**

American Psychological Association. (2001). Publication manual of the American Psychological Association (5th ed.). Washington, DC: Author.

**V. Course Rationale:**

**Relationship of Topic to Teaching, Scholarly Productivity, and Service.** Technology Education is a rapidly changing field of study. The reasons for these changes are simple. That segment of society from which the technology education draws its knowledge base -- industry and technology -- is going through fantastic and very rapid changes. To respond to these changes a teacher much also change, learn new content, try new teaching strategies, and be a life-long learner.

Since entering your undergraduate program you have changed and learned many things. As you reflect upon your past learning experiences you probably realize that there has been a slow shift from teacher directed activities/learnings to student directed activities/learnings. You have studied a variety of products, processes, and systems in several technological settings. Many of these studies have been teacher directed. The purpose of this course is to help you develop you're life-long learning and research skills by giving you the

opportunity to conduct in-depth research on an approved topic related to technology. The results of this researcher will be formally presented to your peers and faculty members.

In many ways, you will become the most knowledgeable person in the department concerning your selected topic.

## **VI. Course Objectives:**

Upon satisfactorily completing this course, the student will be able to:

1. Select and seek approval of an appropriate topic for investigation.
2. Describe the elements of a research proposal and the function they each serve in describing your research plan.
3. Develop a project brief or research proposal that clearly describes the purpose, significance, project assumptions / assumptions / definitions, methodology, resources, etc of a proposed study.
4. Conduct a research project or complete a project design that fulfills the proposal's proposed outcomes.
5. Analyze project data, results, or solutions and effectively report them in a written document.
6. Effectively present project or research findings to peers and faculty.

## **VII. Course Content:**

The following information is being presented in the form of a “course agenda” as opposed to a course outline. The “course agenda” is designed to communicate what you will be doing.

- I. Identifying the Topic of Study
- II. Topic Approval Form
  - A. Determining project theme / topic
  - B. Completing form
    1. individual or group
    2. problem statement
    3. preliminary timeline
    4. procedures
  - C. Project abstract
  - D. Submitting form
  - E. Revising / Topic Approval
- III. Developing Project Brief or Proposal
  - A. Problem statement / background
  - B. Purpose
  - C. Research question(s) or hypotheses

- D. Project need or significance
- E. Project Assumptions / Limitations / Definitions (budget, timeline, other)
- F. Related research or literature review
- G. Research design or methodology
- H. Project specifications or criteria
- I. Procedures for project evaluation
- J. Summary

**Depending on the type of project ( development or assessment)  
one of two different agendas might be followed.**

- IV. Project Design and Research
  - A. Generating ideas
  - B. Developing / refining solutions
  - C. Communicating potential solutions
- V. Selecting the Best Solution / Process / System
  - A. Assessing potential solutions
  - B. Measuring potential solutions against project specifications or criteria
  - C. Selecting optimal solution based upon project specifications or criteria
- VI. Developing the Optimal Solution
- VII. Modeling / Prototyping the Solution
  - A. Solid modeling
  - B. Graphic modeling
  - C. Mathematical modeling or analysis
  - D. Specifying the solution
- VIII. Testing / Evaluation
  - A. Assessing solution against project specifications or criteria
  - B. Recording / analyzing results
- IX. Presenting / Communicating Project Results
  - A. Formal presentation
  - B. Research paper
  - C. Project display
  - D. Project prototype / mock-up (as appropriate)
- IV. Conducting the Project
  - A. Planning / Conducting
    - 1. define and establish project goals and objectives
    - 2. identify processes or procedures to accomplish goals and objectives
    - 3. identify constraints
    - 4. establish procedures for overcoming constraints or collecting data
    - 5. identify and schedule activities to complete goals and objectives (Clark, 1987)
    - 6. collect data or information
  - B. Analyzing project data or results
    - 1. visual

- 2. statistical
  - a. descriptive
  - b. inferential (Seymour, 1987)
- C. Evaluating project results
  - 1. interpreting data or results
  - 2. drawing conclusions from data or results
- D. Reporting project results
  - 1. written
  - 2. oral
- E. Summarizing project results

**The project may include the following tasks:**

**This list is not intended as a step-by-step procedure — it is provided as a potential checklist to aid or monitor project progress.**

- A. Conceptualizing the project
- B. Problem statement and purpose
- C. Project approval
- D. Project brief / proposal
- E. Conducting the project
- F. Analyzing project results
- G. Formal updates
- H. Calendar / timeline
- I. Alternative solutions
- J. Chosen solution
- K. Developmental work
- L. Prototype
- M. Solution testing and evaluation
- N. Redesign
- O. Evaluating the project
- P. Reporting project results
- Q. Presentation development
- R. Summarizing the project
- S. Presentation
- T. Final project approval

### **VIII. Instruction Strategies:**

- A. Content and assignments are given in readings, presentations, and activity worksheets. Cooperative and individual student-centered assignments are used. The selection, planning, and implementation of effective programs and instructional practices are a major segment of this course.

**IX. Plan for Evaluating Student Achievement:**

A. Proposed Activities and Point Values:

1.	Form Development	20 points
2.	Proposal Elements	30 points
3.	APA Format	20 points
4.	Calendar of Events	30 points
5.	Proposal	100 points
6.	Draft Report	50 points
7.	Written Report	100 points
8.	Oral Presentation	50 points
9.	Oral Presentation Support Materials	25 points
10.	Exams	100 points

**Possible 525 points**

**NOTE:** Other activities and/or point values may be identified during the first day of class or 2 weeks before an assigned due date.

**The Grading Scale** will be a follows:

100 - 92.5 %	of total possible points	= A
92.4 - 90 %	of total possible points	= A-
89.9 - 87.5 %	of total possible points	= B+
87.4 - 82.5 %	of total possible points	= B
82.4 - 80 %	of total possible points	= B-
79.9 - 77.5 %	of total possible points	= C+
77.4 - 72.5 %	of total possible points	= C
72.4 - 70 %	of total possible points	= C-
69.9 - 67.5 %	of total possible points	= D+
67.4 - 62.5 %	of total possible points	= D
62.4 - 60 %	of total possible points	= D-
below 59.9 %	of total possible points	= F

Exception to the above policy will occur under the following conditions:

1. Failure to comply with the **Class Attendance/Assignment/Test Policies**.
2. **Abuse** of equipment, laboratory facilities, and/or materials.
3. Failure to perform activities **as assigned**.
4. **Other - Any student missing 3 or more days of class may be asked to withdraw.**

#### **X. Optional Information:**

Various curriculum resources are available in the professional laboratory but they are not to leave the room. A photo copier is available for duplication of these materials (**in limited quantities**). Please seek permission before copying materials.

#### **XI. Methods of Course Evaluation:**

The Departmental Course/Instructor Evaluation System will be used to assess this course. Feedback from the assessment will be used to improve the teaching effectiveness of the instructor and course content.

#### **XII. Laboratory Experiences and Hours**

Most of the course requirements involve homework. Some class time will be used for activities that advance class objectives. The professional laboratory is open and supervised by a qualified assistant during hours posted on the door. At other times, when assistance is need, please drop by my office (*anytime*) for assistance. During open-lab, you are encouraged to use the reference materials and equipment for completing required class activities. **However, for the convenience of others, reference materials are not to leave the room.**

Each individual is expected to leave the laboratory and equipment in good order after usage. The student will be held responsible for all equipment he or she uses. It is the student's responsibility to clean/straighten the area or areas in which they have worked and report damaged equipment.

Students are expected to maintain an attitude of safety in all activities related to the course. Students should see the instructor/laboratory assistant before pursuing activities requiring special procedures.

**No student is to use any equipment/program until he/she has been given adequate instruction and approval for its use.**

**Any student who modifies/changes any computer files/programs may lose the privilege of their use for the remainder of the semester.**

### **XIII. References/Bibliography:**

American Psychological Association. (1997). Publication manual of the American Psychological Association (4th ed.). Washington, DC: Author.  
Technology for All Americans: A Rationale and Structure for the Study of Technology. (1996). International Technology Education Association, Reston, Virginia.

### **XIV. Attendance/Assignment/Test Policy:**

- A. All students are to comply with the "Class Attendance Policy" as described in the Ball State University Undergraduate Catalog. **Students with excessive (three or more) absences or tardies can expect to have their final grade lowered by at least 1/2 letter grade.**
- B. Students are responsible for **making up all work missed** by being absent from class. The instructor would appreciate **a phone call notifying** him of a planned absence due to illness or personal emergency.
- C. All assignments and tests are to be submitted or taken as scheduled.
- D. A student's grade for a given activity or assignment will be lowered 10% for each day it is late. (**Note:** An assignment is considered to be one day late even though it is turned-in after class on the day it is due.)
- E. ***No activity or assignment will be accepted for evaluation once that activity or assignment has been returned to the class.***
- F. All work submitted for this class must be original work. Material that has been submitted for another class **can not** be used in this class.
- G. Before assessing any activity or assignment its' **Professional Appearance** will be assessed. Any work not passing the professional appearance assessment will be returned to the student ungraded.  
Professional materials have the following characteristics:

- They are accurate.
- They, when appropriate, include computer generated materials with a backup disk.
- They often illustrate large quantities of information graphically.
- They are grammatically correct including sentence structure and spelling.
- They are neat, organized to facilitate communication, and are consistent in format and style (e.g., APA).
- They effectively use color and/or graphics, headings, margins, spacing, and text to highlight information and enhance communication.
- They represent quality work and demonstrates proper techniques/practices.

**XV. Special Student Needs:**

If you need course adaptations or accommodations because of a disability, if you have emergency medical information to share with me, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible. My office location and phone number is AT 207C and 765-285-5653 respectively.

**Potential topics for investigation include (only one student or small group per topic will be allowed):**

- I. Communication
  - A. Fiber Optic or Light Communication
  - B. Producing Holograms
  - C. Digital Graphics or Photography
  - D. Electronic Controls
  - E. Virtual Reality
  
- II. Construction
  - A. Design/Build to Resist Nature (i.e., earth quakes, hurricanes, tornadoes, etc.)
  - B. Constructing the Seven Wonders of the World
  - C. Underground Structures
  - D. Constructing Tunnels
  - E. Superstructures
  
- III. Manufacturing
  - A. Plastics Technology
  - B. Non Traditional Machining
  - C. Textile Manufacturing
  - D. Systems Simulation / Analyses
  - E. Ceramics Technology
  
- IV. Transportation
  - A. Hovercraft
  - B. Space Shuttle Physics
  - C. Inter-modal Transportation
  - D. High Interchanges or Rest Stops
  - E. Scheduling Transportation Systems
  
- V. Design / Other
  - A. Biotechnology
  - B. Graphic Design
  - C. Ergonomics
  - D. Toxic Waste or Spill Recovery
  - E. Safety Systems / Strategies
  - F. Greenhouses
  
- VI. Instructional
  - A. Discovery Learning

- B. Teaching with Modules
- C. Using Technology Kits / Toys
- D. Teaching with Multi-media
- E. Problem-Solving
- F. Technology Education in the Elementary Grades