PROCEDURAL SEQUENCE FOR ACADEMIC SENATE APPROVAL OF PROPOSALS

1. Submit all proposals to the Office of Academic Affairs.

2. The Senate President will log items and forward them to the appropriate Senate subcommittees.

3. The Senate subcommittee will send the proposal to the Senate.

4. Senate proposals will be considered by the Full Faculty.

5. If approved, the proposal will then be forwarded to the Provost/Senior Vice Chancellor.

Proposals that require action to approve/disapprove/table or remand will be sent back to the Senate according to the monthly meeting schedule.

TITLE: Industrial Technology B.S. Degree w/Education Option

SUBCOMMITTEE: ~~Sec Ed~~ / Teacher's Ed **PROPOSAL #:** 99-43

PROPOSAL:

Action Signatures:

Daryl Thackray — Date

Submitter

Daryl Thackray — Date

College Chair/Dean

Committee Chair — Approve ✓ Disapprove ____ Date 4/18/00

Scott MacKenzie — Committee Chair — Approve ✓ Disapprove ____ Date 4/18/00 4/18/00

Faculty Senate President — Approve ✓ Disapprove ____ Date 4/24/00

Provost/Senior Vice Chancellor for Academic Affairs — Approve ✓ Disapprove ____ Date 5/25/00 5/26/00

Revised: 11/15/99

Program Revision Form

NEW __X__ DROPPED_____ MAJOR REVISION _____ INFORMATION ONLY _____
ate: April 2000

Department College of Technical Sciences Program Area Industrial Technology Bachelor of Science with Education option

Please provide in the space below a "before & after" picture of the program with the changes in the program noted. Attach appropriate Course Revision Forms.

NOTE: The non-teaching degree MUST include a minor.

FRESHMAN YEAR

Courses to be taken Fall Semester			
Core Courses			
CIS	110	Intro to Computers	3
DRFT	131	Graphics I	4
ENGL	111	Written Communication I	3
IT	1xx	~~Mfgt. Technology~~ Prod. Tech.	3
IT	1XX	Communication Tech	3
Teaching Option			
EDPY	112	Intro to Brain Compat. Learning	3
		Non-teaching Option	13
		Teaching Option	16

Courses to be taken Spring Semester			
Core Courses			
CET	209	Intro to Woodworking	3
ENGL	112	Written Communication II	3
IT	1XX	~~Suggested Tech Course~~ Construction Technology	3
MATH	110	Math for Liberal Arts	4
		OR	
MATH	112	College Algebra	3
METL	155	Machining Processes	3
Non-Teaching Option			
TECH	100	Industrial Safety/Waste Mgmt.	2
		Non-teaching Option	17
		Teaching Option	~~16~~ 18

SOPHOMORE YEAR

Courses to be taken Fall Semester			
ore Courses			
CET	173	Architectural Cnst. & Materials	3
IT	2xx	Energy/Power Technology	3
METL	140	Intro to Welding & Cutting	3
SPCH	141	Intro to Speech	3
Teaching Option			
PSYC	205	Human Growth	3
Non-Teaching Option			
		Minor	3
		Non-teaching Option	15
		Teaching Option	15

Courses to be taken Spring Semester			
Core Courses			
AUTO	128	Engines	4
CET	213	Carpentry	3
DRFT	156	Intro to CAD	3
EET	110	Electronics Survey I	3
Teaching Option			
HPE	235	Prin. ofHealth Ed/Subst. Abuse	3
Non-Teaching Option			
		Minor	3
		Non-teaching Option	16
		Teaching Option	16

JUNIOR YEAR

Courses to be taken Fall Semester			
Core Courses			
		Suggested Tech course	3
CIS	360	Bus. Telecomm./Networking (C)	3
		Lab Sciences (Area C)	3
Teaching Option			
EDPY	215	Designing a Learning Envir.	3
VOED	350	Prin. Of Applied Technology	3
		Suggested Tech Course	3
Non-Teaching Option			
		Minor	3
EET	305	Digital Systems	3
		Non-teaching Option	15
		Teaching Option	18

Courses to be taken Spring Semester			
Core Courses			
		Gen Ed (A or B)	6
	3xx	Gen Ed (A or B)	3
Teaching Option			
EDUC	455	General Teaching Methods	3
VOED	360	Analysis/Prep of Instruct Materials	3
		Elective	3
Non-Teaching Option			
		Minor	6
EET	450	Advanced Digital Systems	3
		Non-teaching Option	18
		Teaching Option	18

SENIOR YEAR

Courses to be taken Fall Semester

ore Courses

		Elective (300-400 level)	3
		Gen Ed (300-400) (Area A or B)	3
Teaching Option			
EDUC	376	Assessment	3
EDUC	380	Classroom Envir. & Mgmt	3
VOED	370	Organizing & Teaching App Tech	3
Non-Teaching Option			
BUS	300	Mgmt. In Organizations	3
MFGT	427	Quality Assurance	3
		Minor (Upper Division)	3
		Non-teaching Option	15
		Teaching Option	15

Courses to be taken Spring Semester

Core Courses

Teaching Option			
EDUC	405	Current Issues in Ed	3
EDUC	450	Sec. Ed Practicum & Seminar	12
Non-Teaching Option			
		Minor (Upper Division)	11
		Non-teaching Option	11
		Teaching Option	15
		Non-teaching Option total credits	120
		Teaching Option total credits	128

Suggested Industrial Tech Ed Courses:

EET	205	Communications Fundamentals	4
DIES	204	Intro to Hydraulics/Pneumatics	2
DIES	214	Intro to Hydraulics/Pneumatics Lab	2
AUTO	151	Diagnosis and Tune Up	3
AUTO	152	Diagnosis and Tune Up Lab	3
MFGT	341	CAD/CAM Applications	3
MFGT	342	CAD/CAM II	3
DSN	220	Illustration I	3
CET	220	Cnst. Mgmt & Bid Estimation	3
METL	265	Intro to CNC/CAM	3

IT Course Syllabus

Course Number:
Course Title: Manufacturing Technology
Credits:

Overview

Manufacturing Technology is a course designed to give the student an overview of manufacturing processes. The main focus of the course will be on secondary processes and their role in an industrial environment. The lecture time will concentrate on industrial processing. Laboratory activities will simulate industrial processes to involve the student in the major categories of forming, separating, fabricating, conditioning, and finishing.

Upon completing this course the student will be able to:

1. Explain and provide examples of the manufacturing processes listed in the course outline.
2. Identify and describe the manufacturing process by which different metal, wood, and plastic objects are made.
3. Demonstrate improved technical writing skills by completion of specified laboratory reports and term paper.
4. Demonstrate basic problem solving skills relating to manufacturing and production.
5. Perform precision measurement on laboratory work using industrial metrology equipment.
6. Perform basic machine planning functions for various machining operations including milling, drilling, sawing, turning and grinding.
7. Calculate appropriate machining process variables by applying metal cutting theories and formulas relating to cutting speeds and feeds, horsepower requirements, material removal rates, cutting tool geometry/material, and workpiece condition.
8. Perform basic manufacturing and machining operations safely in a laboratory setting.
9. Demonstrate the ability to use and care-for hand tools, machinery, and metrology apparatus.

Introduction to Manufacturing and Manufacturing Materials

A. The global challenge
B. Other competition for manufacturing superiority
C. What is manufacturing
    1. Material processing categories
        a. Primary processing
        b. Secondary processing
    2. Major material families (MMFs)
        a. Polymeric -- Plastics and woods industries
        b. Metals -- Metals industry
        c. Composites -- Advanced properties products

d. Woods -- Construction and furniture industries
e. Ceramics -- Clay and glass industries

3. Material processing families
   a. Forming
   b. Separating
   c. Fabricating
   d. Conditioning
   e. Finishing

I. Forming Processes
   A. Ways to categorize molding and casting processes
   B. Plastics molding processes
      1. Injection molding
      2. Compression molding
      3. Transfer Molding
      4. Blow molding
      5. Rotational molding
      6. Dip and slush casting
      7. Foam molding
   C. Metal casting processes
      1. Green sand casting
      2. Dry sand casting
      3. Shell molding
      4. Permanent casting
      5. Investment casting
      6. Die casting
   D. Forming wood materials
      1. Bonding
      2. Bending
   E. Forming ceramic materials
      1. Dry forming
      2. Wet forming
      3. Glass forming

II. Separating Processes
   A. Definition of separating processes
   B. Three major separating groups
      1. Machining
      2. Shearing
      3. Flame cutting
   C. Three essential elements of separating
      1. Tools of cutting elements
      2. Movement of the workpiece and cutting tool
      3. Clamping techniques
   D. Separating processes
      1. Sawing
      2. Turning
      3. Drilling

4. Milling
5. Shaping and planing
6. Grinding and sanding
7. Shearing
8. Nontraditional processes

E. Numerical control (NC) and Computer Numerical Control (CNC)

III. Fabricating Processes

A. Definition of fabricating
B. Main methods of fabricating
1. Bonding
2. Mechanical fastening
3. Jointery
4. Composite lay-up
C. Methods of bonding
1. Fusion
2. Flow
3. Solvent
4. Adhesive
D. Fusion bonding processes
1. Gas welding (flame and hot gas)
2. Arc welding processes
3. Resistance welding
4. Ultrasonic welding
5. Vibration welding
6. Friction welding
7. Hot tool welding
8. Thermal impulse heat sealing
9. Dielectric heat sealing
10. Solvent bonding
E. Flow bonding
1. Soldering
2. Brazing
3. Solid state welding
4. Adhesive bonding
F. Mechanical fasteners
G. Joinery methods
H. Composite lay-up

IV. Conditioning Processes

A. Definition of conditioning
B. Changing the internal molecular structure
1. Polymerization
2. Fillers
3. Reinforcements
4. Additives
5. Heat treatment
C. Conductive shielding

V. Finishing Processes
- A. Material removal processes
  1. Tumbling
  2. Smoothing and polishing
- B. Material preparation
  1. Cleaning
  2. Deburring
  3. Grinding
  4. Sanding
  5. Fillers
  6. Bleaching, staining, and shading
- C. Coating processes
  1. Dip
  2. Electrostatic powder
  3. Fluidized bed
  4. Flame and plasma spray
  5. Vacuum metallizing
  6. Electroplating
  7. Electroless plating
  8. Glazing
  9. Laser

VI. Planning for Production
- A. Waves of change in manufacturing
  1. First-wave manufacturing
  2. Second-wave manufacturing
  3. Third-wave manufacturing
- B. Design in manufacturing
  1. Value analysis
  2. Design for assembly (DFA)
- C. Planning concepts
  1. Calculating the critical path
  2. Reduce slack time

VII. Automated Manufacturing Systems
- A. The nature of automation
  1. Interchangeability
  2. Throughput
  3. Replication
  4. Volume
  5. Control; system sophistication
  6. Manufacturing flexibility

REQUIRED TEXT:

DuVall, J. Barry. 1996. *Contemporary Manufacturing Processes.* South Holland, Illinois: The Goodheart-Willcox Company, Inc.,

IT Class Syllabus

Course Number:
Course Title: Energy/Power Technology
Credits:

Overview

Energy/Power Technology will examine energy sources, power generation, power transmission and control systems, resistance, power measurement, and devices that provide mechanical force. This course will concentrate on applications of electrical, electronic, mechanical, and fluid power systems as they apply to the manufacturing, communications, and construction industries.

Upon completing this course the student will be able to:

1. Identify current sources of energy and evaluate their future role related to power production considering supply, transportation, efficiency, and environmental impact.
2. Describe the function of energy conversion devices including generators, turbines, solar panels, nuclear reactors, electric motors, and heat engines.
3. Perform accurate precision measurements, calculate mechanical advantage, and determine force and distance relationships for mechanical systems, including gears, pulleys, inclined planes, levers, and chain drives.
4. Apply technical principles to perform measurements and complete calculations on basic hydraulic, pneumatic systems, electrical, and electronic systems. Calculations will require conversion from English to metric system, the use of scientific notation, fractions, decimals, graphing, percentages, volume calculations, and area calculations.
5. Describe the function and applications of fluid power, electrical, and electronic system components including hydraulic pumps, pneumatic compressors, directional and flow control valves, gauges, flow meters, motor controls, distribution panels, resistors, switches, relays, circuit protection devices, capacitors, inductors, batteries, diodes, power supplies, contact and non-contact sensors, programmable controls, computers, and conductors.
6. Read basic fluid power, electrical, and electronic circuit drawings.
7. Given the technical specifications, the student will select basic fluid power, electrical, mechanical and electronic components from manufacturer's literature.
8. Given a typical machine used in manufacturing, printing, or construction, the student will identify the prime mover, describe how the machine transfers power, and calculate the speed and force relationships as power is transferred through the electrical, mechanical, and/or fluid power system. In addition, the student will identify how the machine senses position and controls motion.
9. Demonstrate safe working practices by wearing approved eye protection, using tools and equipment properly, and safely completing assigned laboratory activities.

Content

1. **Energy sources**
    a. Renewable
    b. Non renewable
    c. Environmental considerations
    d. Future prospects
2. **Mechanical power principles**
    a. Units of measure
    b. Measuring instruments
    c. Simple machines
        Mechanical advantage
        Speed changes
    d. Friction
3. **Mechanical power systems**
    a. Gear drive systems
    b. Chains
    c. Belts
    d. Clutches
    e. Bearings
    f. Industrial applications
4. **Fluid power principles**
    a. Pressure
    b. Flow
    c. System components and specifications
    d. Symbols
    e. Circuit reading
    f. Industrial applications
5. **Electrical Current Flow**
    a. System components and specifications
    b. Symbols
    c. Circuit reading
    d. Measuring current
        Scientific notation
        Instrumentation
6. **Voltage**
    a. Producing electrical force
    b. Measuring voltage
    c. Controlling voltage
7. **Resistance**
    a. Factors determining resistance
    b. Types of resistors
    c. Ohms law
        Measuring resistance
        Series and parallel connections

8. Direct current circuits
- a. Series circuits
- b. Parallel circuits
- c. Series-parallel circuits
- d. Industrial applications

9. Magnets and magnetism
- a. Types of magnets
- b. Magnetic units

10. Alternating current circuits
- a. Alternating current production
- b. Measuring alternating current
- c. Industrial applications

11. Circuit components
- a. Switches
- b. Relays
- c. Pilot lights
- d. Fuses

12. Electrical to mechanical force devices
- a. Single and three phase motors
- b. Servo motors
- c. Stepper motors
- d. Solenoids
- e. Linear actuators

13. Electrical distribution systems
- a. Single and multiple systems
- b. Introduction to electrical codes

14. Automated control systems
- a. Interaction of mechanical, fluid power, and electrical systems
- b. Motion control components
- c. Sensors
- d. Programmable controls
- e. Computer I/O
- d. Machine and building control system applications

REQUIRED TEXTS:

R.C. Bohn and A.J. MacDonald. Energy Technology- Power and Transportation. Fourth Edition, Glencoe Publishing Company, 1992

Course Revision Form

NEW____DROPPED____MAJOR REVISION __X__ INFORMATION ONLY____

Department Education Program Area __vocational/industrial educ__ Date: 3/23/2000

Prefix VOED No. 350/550 Title Principles of Applied Technology Credits 3

Required by students currently majoring in Applied Technology/ new degree - Industrial Technology Education

Selective in_____

Elective in_____

General Education_____

Lecture _x__ Lecture/Lab_____ Contact hours lecture _3__ Contact hours lab_____

Current Catalog Description (include all prerequisites): An appreciation of the social and economic values of all forms of education in a democratic society with an emphasis on the contributions made by occupational education. Major areas of inquiry will center around the philosophy and objectives of vocational education; the rules and regulations dealing with vocational certification, education and funding; methods of organizing and advising youth groups; designing and administering cooperative education programs; selecting and utilizing program advisory committees; and, investigating programs that address the school to work concept.

Proposed Catalog Description (include all prerequisites):

(1) The title would become: Principles of Industrial/Technology Technology
(2) Description: An introductory course designed for the industrial technology student to provide a survey and appreciation for the social and economic values of all forms of education in a democratic society. Major areas of inquiry will center around program requirements, historical development, career opportunities, methods of organizing and advising youth groups, and the major academic clusters of the degree, i.e., energy power transportation, production technology, communication technology, and construction technology.

Course Outcome Objectives:

(1) Acquire an appreciation for the social and economic values of all forms of education
(2) Develop an understanding of the historical and philosophical foundations of the various forms of industrial technology (5-12) education
(3) Develop a personal philosophy of industrial technology (5-12) education
(4) Obtain an understanding of the rules and regulations governing industrial technology (5-12) education and the requirements for certification, education, and funding
(5) Develop an understanding of school based components, work based components, and connecting activities that are inherent in school-to-work programs
(6) Develop the necessary competencies to design, develop, and administer an industrial technology (5-12) program
(7) Develop an understanding of the four clusters: energy power transportation, production technology, communication technology, and construction technology as related to 5-12 education

New instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Revised: 03/23/00

Action Signatures:

Submitter — Date 3/23/2000

College Chair/Dean — Date 3/23/2000

Committee Chair College of Educ — Approve X Disapprove ___ Date 3/23/2000

Committee Chair Scott MacKenzie CC — Approve X Disapprove ___ Date 4/18/00

Faculty Senate President — Approve X Disapprove ___ Date 4/18/00

Provost/Senior Vice Chancellor for Academic Affairs — Approve X Disapprove ___ Date 4/24/00

Roger A. Barbon — Approve X Disapprove ___ Date 5/25/00

Course Revision Form

NEW____DROPPED____MAJOR REVISION _x_INFORMATION ONLY____

Department Education Program Area vocational/industrial educ Date: 3/23/2000

Prefix VOED No. 360/560 Title Analysis & Preparation of Instructional Materials Credits 3

Required by Students currently majoring in applied technology/new degree Industrial Technology Education

Selective in_____

Elective in_____

General Education_____

Lecture _x_ Lecture/Lab_____ Contact hours lecture _3_ Contact hours lab_____

Current Catalog Description (include all prerequisites): A course designed to analyze occupations and to develop instructional materials for vocational education courses.

Proposed Catalog Description (include all prerequisites):

(1) Title change: Analysis & Prep Lab Management
(2) Description: This course will provide the student the opportunity to gain an understanding of the basic industrial materials and design applications that form the foundation of our technological society and environment. The course will also provide the 5-12 technology education teacher with information related to effective planning, organizing and controlling of technology facilities.

Course Outcome Objectives:

(1) To develop an understanding and awareness of the preparation of effective instructional materials
(2) To develop skill in analysis techniques
(3) To develop skill in developing content charts, job sheets, operation sheets and courses of study
(4) To gain an understanding and awareness of laboratory/facility safety, maintenance and organization and development

New instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Revised: 02/09/00

Action Signatures:

K Daude 3/23/2000 Submitter	Date	K Daude College Chair/Dean	3/23/2000 Date
K Daude ~~Committee Chair~~ College of Educ	Approve ✓ Disapprove ____		Date 3/23/2000
Scott MacKenzie Committee Chair	Approve ✓ Disapprove ____		Date 4/18/00
R J Urbanek CC Faculty Senate President	Approve X Disapprove ____		Date 4/18/00 4/24/00
Roger A. Barbon Provost/Senior Vice Chancellor for Academic Affairs	Approve X Disapprove ____		Date 5/25/00

Course Revision Form

NEW____DROPPED____MAJOR REVISION _X_INFORMATION ONLY____

Department _Education_ Program Area _vocational/industrial edu_ Date: 3/23/2000

Prefix _VOED_ No. _370/570_ Title _Organizing & Teaching Applied Technology_ Credits _3_

Required by _students currently majoring in applied technolgy/new degree Industrial Technology Education_

Selective in_____

Elective in_____

General Education_____

Lecture _x_ Lecture/Lap_____ Contact hours lecture _3_ Contact hours lab_____

Current Catalog Description (include all prerequisites):A course designed to develop skill in teaching applied technology courses and to organize and manage applied technology facilities.

Proposed Catalog Description (include all prerequisites):

(1) New title: Methods of Teaching Industrial/Technology Education
(2) Description: A course designed to develop skills in teaching industrial technology education. The course will provide a study of the curriculum materials and techniques needed for effective instruction.

Course Outcome Objectives:

(1) To gain an awareness and understanding of the variety of teaching methodology
(2) To gain an awareness and understanding of organizing and managing technology facilities
(3) To gain an awareness and understanding of how students learn and its implications for the 5-12 industrial technology teacher
(4) To gain an awareness and understanding of planning courses, preparing lessons, preparing instructional materials and presenting information

New instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Revised: 02/09/00

Action Signatures:

Submitter — Date: 3/23/2000

College Chair/Dean — Date: 3/23/2000

Committee Chair: College of Educ — Approve ✓ Disapprove ____ Date: 3/23/2000

Committee Chair: Scott MacKenzie — Approve ✓ Disapprove ____ Date: 4/18/00

Faculty Senate President — Approve X Disapprove ____ Date: 4/18/00 4/24/00

Provost/Senior Vice Chancellor for Academic Affairs — Approve X Disapprove ____ Date: 5/25/00