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To all continuing and new BS Industrial Technology students

From Dr. Seth P. Bates, Chair, Aviation and Technology Department
May 11, 2009

Dear Students:

When you view the Fall 2009 Schedule of Classes you may feel that things are just a little different from what you expected. Some slightly different course titles, and some new courses! We are very pleased to announce the initiation of our newly-revised degree concentrations. These curricula were developed over the two years from 2006 to 2008 with input from our Industry Advisory Board, Community College and other community partners, student input, and faculty research. The new curricula respond to developments in industry and the marketplace, specifically in the areas of **wireless, networking, and mobile devices**, and in the rapidly growing area of **sustainable manufacturing and green product design**.

Students currently in the BSIT program may continue with their current program, or switch over to the new curriculum. In most cases you will complete your degree earlier, since the new degree programs are designed to require only 122 semester units for completion.

Revised Concentrations under the BSIT Degree

The Electronics and Computer Technology (ECT) concentration has been renamed and redesigned. Beginning with the Fall, 2009 semester it will be called: **Computer Electronics and Network Technology (CENT)**.

The **Manufacturing Systems** concentration has the same name but has been completely redesigned to focus on **Sustainable Manufacturing and Green Product Design**.

Attached to this announcement you will receive a copy of the required major, support, and minor courses for these programs. New Major Form worksheets will be available on the website (see the Student Forms page), and your advisor will be able to help you decide whether to shift to the new program or stay with the one you are currently enrolled in. No action is required to change to the new programs. You will simply use the new Major Forms when you apply for graduation. New students beginning in the Fall semester will declare their concentration as usual.

Developing these new concentrations has been a lot of work, but we are excited to be able to bring you these changes. I thank all of our faculty and industry partners for helping us with the work over the past two years. If you are a community college student, go to our website to learn about the Mission College Connection for these programs!

Do not hesitate to discuss these programs with your advisor!

Attachments: CENT Program Overview, CENT Course Descriptions
(Sustainable) Manufacturing Systems Overview, Course Descriptions

Course Overview for the B.S. Industrial Technology with concentration in
Computer Electronics and Network Technology
(C.E.N.T.)

Required Courses in Technology

Lower Division Courses

18 units

- Tech 031: Quality Assurance and Control
- Tech 060: Introduction to Electronics
- Tech 062: Analog Circuits
- Tech 063: Digital Circuits
- Tech 065: Networking Theory and Application
- Tech 066: Networking Administration

Upper Division Courses

33 Units

- Tech 115: Automation and Control
- Tech 160: Microprocessors Theory and Applications
- Tech 163: Telecommunications Systems
- Tech 165: Wireless Communications Technology
- Tech 167: Control Systems
- Tech 169: Applied Electronic Design
- Tech 190: Senior Seminar in Technology
- Tech 198: Technology and Civilization
- Engr 100W: Engineering Reports
- Electives: 6 units from:
Tech 145, Tech 162, Tech 164, Tech 168, ME 106, ISE 102

Required Minor in Business Management

15 Units

- Bus 090: Business Statistics
- Bus 142: Total Quality Management
- Bus 141: Materials Management
- or >
- Bus 144: Supply Chain Management
- Bus 140: Fundamentals of Operations Management
- or >
- Bus 145: Global Operations Management
- Bus 186 : Professional and Business Ethics

Support Courses

24 Units

- Chem 30A and Chem 30B (6) *
- Phys 2A and Phys 2B (8) **
- Math 71 (3) ***
- Econ 1B (4)
- CompE 30 (3) ****

Substitutions:

- * You may substitute Chem 1A (5 units) for Chem 30A and Chem 30B
- ** You may substitute Phys 50 and Phys 51 (8 units) for Phys 2A and Phys 2B
- *** You may substitute Math 30P (5 units) or Math 30 (3 units) for Math 71
- **** You may substitute CompE 46 (3 units) or CS 049C or J for CompE 30

Course Descriptions for the BS Industrial Technology with concentration in Computer Electronics and Network Technology

(C.E.N.T.)

Lower Division

Tech 031: Quality Assurance and Control **3**
Description: Introduction to concepts and statistical methods that companies use to manage and improve quality. Sampling inspection, statistical process control, quality function deployment, cost of quality, design of experiment and Taguchi's method for designing in quality.
Prerequisite: BUS 090 or equivalent. Lecture 2 hours/Lab 3 hours.

Tech 060: Introduction to Electronics **3**
Description: Emphasizes practical electronics applications and products. DC and AC theory; Ohm's Law, Kirchoff's Laws, Power Laws, network theorems, schematic diagrams, instrumentation and measurement, and functions of discrete components. Prerequisites: None.
Lecture 3 hours.

Tech 062: Analog Circuits **3**
Description: Semiconductor theory; p-n junction, bipolar transistors, JFETs and MOSFETs, optoelectronic devices. Operational amplifiers and 555 timers. Device applications: comparators, signal generators, active filters, instrumentation amplifiers, voltage regulators and power supplies.
Prerequisite: Tech 60, Math 71 or Math 30. Lecture 2 hours/lab 3 hours.

Tech 063: Digital Circuits **3**
Description: Logic gates emphasizing TTL and CMOS. Design techniques. Combinational circuits, counters, registers, multiplexers, demultiplexers, encoders, decoders, DAC, ADC and ALU. Prereq: Tech 60. Lecture 2 hours/lab 3 hours.

Tech 065: Networking Theory and Application **3**
Description: Introduction to networks and networking concepts. Network architectures. Network media. Configuring network operating systems. Making networks work. Network topology, standards, and protocols. Basic network design. Pre/Coreq: Tech 63. Lecture 2 hours/lab 3 hours.

Tech 066: Networking Administration **3**
Description: Internetworking devices and systems. Network administration and support. Enterprise and Distributed Networks. Wide-Area and Large Scale Networks. Solving network problems. Using the resources of the Internet. Future networking technologies. Telemeter networks. Manufacturing automation. Systems networks, Storage area networks. Prereq: Tech 65. Lecture 2 hours/Lab 3 hours.

Lower Division Courses total 18 units

Upper Division

Tech 115: Automation and Control **3**
Description: Theory and application of automation elements including analog and digital sensors, controllers, indicators, actuators. Control modes for proportional, derivative, and integral control systems. Hands-on integration practices among PLC, robots, automatic identification devices, computers, and other industrial equipment. Prerequisite: Tech 60, Phys 2A, Math 71.
Pre/Corequisite: Phys 2B. Lecture 2 hours/lab 3 hours.

Tech 160: Microprocessors Theory and Applications **3**
Description: Microprocessor concepts and applications to testing and data management. Assembly language and high-level language programming and techniques, including assembling,

compiling, debugging. Current trends and issues in microprocessors. Prerequisites: Tech 63, Tech 115, CS 49C or CS 49J. Misc/Lab: Lecture 2 hours/lab 3 hours.

Tech 163: Telecommunications Systems **3**

Description: Communications systems. Types of modulation. Transmitters and receivers. Digital communications. Data transmission. Digital modulation and modems. Multiplexing and multiple-access techniques. Wireless communication systems. Microwave devices. Satellite communications. Fiber optics systems. Prereq: Tech 62, Tech 63. Lecture 3 hours.

Tech 165: Wireless Communications Technology **3**

Description: Digital wireless technologies. RF Communications. Wireless Personal Area Networks. Wireless Local Area Networks. Wireless Metropolitan Area Networks. Wireless Satellite Fixed Broadband. Wireless Wide Area Networks. Radio Frequency Identification. Wireless Communications in Business. Emerging wireless technologies. Prerequisites: Tech 63, Tech 65. Lecture 2 hours/lab 3 hours.

Tech 167: Control Systems **3**

Description: Theory and applications of feedback systems, transfer functions and block diagrams. Transducers, analog and digital controllers, signal conditioners and transmission. Analysis, testing, and troubleshooting of electronic systems with feedback. Prerequisite: Tech 63, Tech 115, CS 49C or CS 49J. Lecture 2 hours/lab 3 hours.

Tech 169: Applied Electronic Design **3**

Description: Design, test, simulation, development and implementation of electronic systems for control of industrial processes using project management techniques and team work. Hardware, software, and system interfacing. Prereq: Tech 167. Lecture 2 hours/lab 3 hours.

Tech 190: Senior Seminar in Technology **3**

Description: Current industry analysis and career development. Technology trends in manufacturing and electronics. Leadership skills for a technology professional. Ethics for technology managers. Lecture 3 hours.

Tech 198: Technology and Civilization **3**

Description: History, development, and use of technology in different cultures. Technology's impact on society, global environment, the workplace, cultural values, gender roles, and newly industrialized countries of the world. Prerequisite: Completion of core GE, satisfaction of Writing Skills Test and upper division standing. For students who begin continuous enrollment at a CCC or a CSU in Fall 2005 or later, completion of, or corequisite in a 100W course is required. Lecture 3 hours.

Engr 100W: Engineering Reports **3**

Description: Regular technical writing assignments and company-focused oral presentations while integrating effects of environmental factors as they relate to products, systems and engineering processes. Prerequisite: ENGL 1B (with a grade of C or better); Completion of core GE, satisfaction of Writing Skills Test and upper division standing. Lecture 3 hours.

Electives: 6 units selected from the following list: **6**
Tech 145, Tech 162, Tech 164, Tech 168, ISE 102

Upper Division Courses total 24 units

Required Minor in Business Management **15**

Support Courses in Math, Chemistry, Physics, Economics, and computer Science **24**

Units for the degree **122**

Course Overview for the B.S. Industrial Technology with concentration in Manufacturing Systems

(Sustainable Manufacturing and Green Product Design)

Required Courses in Technology

Lower Division Courses

21 units

Tech 020: Design and Graphics
Tech 031: Quality Assurance and Control
Tech 025: Introduction to Materials
Tech 040: Intro to Product Design & Manufacturing
Tech 041: Machine Shop Safety and Fundamentals
Tech 045: Sustainable Facilities Design & Planning
Tech 046: Machine Operation and Management
Tech 060: Introduction to Electronics

Upper Division Courses

30 Units

Tech 115: Automation and Control
Tech 140: Green and Sustainable Product Design
Tech 145: Lean Manufacturing
Tech 147: Green Manufacturing Analysis and Mgt
Tech 149: Computer Integrated Manufacturing Systems
Tech 190: Senior Seminar in Technology
Tech 198: Technology and Civilization
Engr 100W: Engineering Reports
Electives: 6 units including 3 upper division from:
Tech 41, Tech 65, Tech 141, Tech 148, Tech 164, ME 106, ISE 102

Required Minor in Business Management

15 Units

Bus 090: Business Statistics
Bus 142: Total Quality Management
Bus 141: Materials Management
or >
Bus 144: Supply Chain Management
Bus 140: Fundamentals of Operations Management
or >
Bus 145: Global Operations Management
Bus 186 : Professional and Business Ethics

Support Courses

24 Units

Chem 30A and Chem 30B (6) *
Phys 2A and Phys 2B (8) **
Math 71 (3) ***
Econ 1B (4)
CompE 30 (3) ****

Substitutions:

- * You may substitute Chem 1A (5 units) for Chem 30A and Chem 30B
- ** You may substitute Phys 50 and Phys 51 (8 units) for Phys 2A and Phys 2B
- *** You may substitute Math 30P (5 units) or Math 30 (3 units) for Math 71
- **** You may substitute CompE 46 (3 units) or CS 049C or J for CompE 30

**Course Descriptions for the BS Industrial Technology with concentration in
Manufacturing Systems**

Lower Division

Tech/ME 020 Design and Graphics **2**

Description: Introduction to design and graphical solutions to three-dimensional design problems involving points, lines, surfaces and solids. Development of visualization and technical sketching skills in conjunction with orthographic and pictorial projections. Focus on computer-aided design and graphical analytical methods. Corequisite: ENGR 10. Misc/Lab: Lecture 1 hour/lab 3 hours.

Tech 025 Introduction to Materials **3**

Description: Study of industrial materials and their applications including metals, polymers, and composite materials. Selection principles. Laboratory experimentation, testing and evaluation procedures. Prerequisite: CHEM 1A and PHYS 2A (or equivalent). Lecture 3 hours.

Tech 031 Quality Assurance and Control **3**

Description: Introduction to concepts and statistical methods that companies use to manage and improve quality. Sampling inspection, statistical process control, quality function deployment, cost of quality, design of experiment and Taguchi's method for designing in quality. Prerequisite: BUS 90 or equivalent. Misc/Lab: Lecture 2 hours/lab 3 hours.

Tech 040 Introduction to Product Design and Manufacturing **3**

Description: Introduction to product design and manufacturing process with attention to green and sustainable product design. Introduction to three-dimensional solid modeling. Computer-aided design, manufacturing, and analysis using commercially available software. Familiarize students with design for manufacturing. Principles for green and sustainable product development.

Tech 041 Machine Shop Safety and Fundamentals **1**

Description: Introduction to basic machine shop safety and skills. Fabricating of mechanical components and assemblies from engineering drawings, performing tolerance inspection, developing fabrication process plans. Prerequisites: ME 020, Tech 020, CE 020 or equivalent. Lab 3 hours.

Tech 045 Sustainable Facilities Design and Planning **3**

Description: Construction, planning, and maintenance of physical facilities and equipment for sustainable manufacturing operations. Green and sustainable practices and standards, plant facilities layout/design, regulatory and environmental compliance, safety/security, energy conservation, and process improvement. Production line planning. OSHA and NIOSH standards.

Tech 046 Machine Operation and Management **3**

Description: Current machining processes using computer numerically-controlled and manual machines, including turning, milling, drilling, grinding, and sawing machines. Manual and computer-aided part programming. Management of machining environment including processes, tooling, instruments, equipment, personnel safety. Prerequisite: Tech/ME 20. Misc/Lab: Lecture 2 hours/lab 3 hours.

Tech 060 Introduction to Electronics **3**

Description: Electronic principles underlying commonly used high technology devices and systems such as iPhones, digital cameras, HDTV, cell phones, IPODS, and the Internet. Emphasizes practical applications of electronics principles, AC and DC principles in contemporary electronics products and services. Lecture 3 hours.

Lower Division total 21 units

Upper Division

Tech 115	Automation and Control	3
Description: Theory and application of automation elements including analog and digital sensors, controllers, indicators, actuators. Control modes for proportional, derivative, and integral control systems. Hands-on integration practices among PLC, robots, automatic identification devices, computers, and other industrial equipment. Prerequisite: Tech 60. Misc/Lab: Lecture 2 hours/lab 3 hours.		
Tech 140	Green and Sustainable Product Design	3
Description: Advanced product and process design with a focus on sustainable design and manufacturing for green products. Analysis of process and material selection. Polymers, composites and advanced materials processing. Laboratory exercises in designing and processing. Planning for green manufacturing. (Prereqs: Tech/ME 40)		
Tech 145	Lean Manufacturing	3
Description: Exploration and practice of techniques for reducing waste to optimize the value stream in both manufacturing and non-manufacturing environments. Toyota Production System, Value Stream Mapping, 7 Wastes, 5S, Just-in-Time, TPM, Kaizen. Prerequisite: Bus 140 or Bus 145 or ISE 140.		
Tech 147	Green Manufacturing Analysis & Management	3
Description: Design, operation, and control of production systems using computational and simulation techniques to promote sustainability and minimize environmental impact. Emphasis is on the physical design of high performance manufacturing and will include production flow, scheduling, work flow, layout of manufacturing plants, and material handling. Misc/Lab: Lecture 2 hours/lab 3 hours.		
Tech 149	Computer Integrated Manufacturing Systems	3
Description: Integration of all aspects of a manufacturing enterprise using computer-integrated manufacturing (CIM) technologies. Design development and implementation of manufacturing systems using project management techniques and team work. Prerequisite: Tech 146, Tech 147, ME 106. Misc/Lab: Lecture 2 hours/lab 3 hours.		
Tech 190	Senior Seminar in Technology	3
Description: Current industry analysis and career development. Technology trends in manufacturing and electronics. Leadership skills for a technology professional. Ethics for technology managers. Prerequisite: Graduating senior, major form completed. Lecture 3 hours.		
Tech 198	Technology and Civilization	3
Description: History, development, and use of technology in different cultures. Technology's impact on society, global environment, the workplace, cultural values, gender roles, and newly industrialized countries of the world. Prerequisite: Completion of core GE, satisfaction of Writing Skills Test and upper division standing. For students who begin continuous enrollment at a CCC or a CSU in Fall 2005 or later, completion of, or corequisite in a 100W course is required.		
Engr 100W	Engineering Reports	3
Electives:	Six units selected from the following list:	6
	ME/Tech 041, Tech 065, Tech 141, Tech 148, Tech 164, ME 106; ISE 102	

Upper Division total 30 units

Required Minor in Business Management	15
Support Courses in Math, Chemistry, Physics, Economics, and computer Science	24
Units for the degree	122

Tech/ME41 Machine Shop Safety and Fundamentals

San Jose State University / College of Engineering
Aviation and Technology Department

Mechanical & Aerospace Engineering Department

New Course Announcement

Machine Shop Safety and Fundamentals

Description: Introduction to basic machine shop safety and skills. Fabrication of mechanical components and assemblies from engineering drawings, performing tolerance inspection and developing fabrication process plans.

Prerequisites: ME 20, Tech 20, CE 20 (or equivalent) 1 unit, laboratory

The faculty of the Technology and Mechanical Engineering Departments announce the availability of a new lab course in Machine Shop Safety and Fundamentals, to be offered in several sections each semester beginning with Fall 2009. All Mechanical Engineering and Manufacturing Systems students are encouraged to enroll in this one-unit course in order to develop and enhance your knowledge of how to take ideas and make them come to life in real products. New Manufacturing and Mechanical Engineering students will find a terrific opportunity to learn about a range of processing techniques, machinery, and safe lab practices. Students who have already completed Tech 46 or ME/ISE 110 will find this is a wonderful opportunity to get three hours each week in the processing labs!

As a 1-unit lab, most students will be able to add this course to their schedules without any increase in fees. The course may be repeated for credit, and many students will enroll in Tech/ME 41 several times before graduation, to gain open lab experience and the opportunity to work on creative ideas and Senior Capstone projects.

Fall 2009 Course Schedule:

Tech/ME 41 Lab Sections for Fall 2009		
Tech 041-01	M 1200-1445	IS 119/122
Tech 041-02	T 1500-1745	IS 119/122
Tech 041-03	W 1800-2045	IS 119/122
Tech 041-04	W 1200-1445	IS 119/122
Tech 041-05	R 1430-1715	IS 119/122

Register for this lab section early and often!