**Advanced Technology Division**

**Program Learning Outcomes - 2005**

## Electronic Technology

| | PROGRAM COURSES | | | | | | | | | | | | | | | | | General Education | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EET 129 Electrical Theory 1 | EET 121 Shop Practices | EET 151 Digital Electronics 1 | EET 130 Electrical Theory 2 | EET 145 Semiconductor Devices 1 | EET 152 Digital Electronics 2 | EET 131 Electrical Theory 3 | EET 146 Semiconductor Devices 2 | ELT 277 Electronics Troubleshooting | ELT 282 Hardware Computers : IO | EET 247 Linear Circuits | EET 234 Programmable Controllers | EET 239 Microprocessor Applications | ENGR 280E Cooperative Education | EET 201 Industrial Instrumentation | ELT 281 Radiotelephone and Comm Equip | EET 232 Robotics | Human Relations * | MTH 095 Intermediate Algebra | MTH 111 College Algebra | WR 121 English Composition | | WR 227 Technical Report Writing | CS 120 Concepts of Computing | CS 160 Intro to Programming | Mth 065 Elementary Algebra | HE 125 Work Place Safety | He 252 First Aid | PE Health Requirement |
| Associate Degree Credit Hours (94 Total Credits) | 4 | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 5 | 5 | 3 | | 3 | 4 | | 4 | | 3 | |
| **Program Learning Outcomes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Demonstrate employability skills required for initial employment and advancement in the industry that include: attendance, proper attire, customer relations, following directions, working in teams, and understanding work rules and ethics. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | S | S | S | | | P | S | S | | | P | |
| Demonstrate safe work practices and tool usage while performing operations in a shop environment. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | S | |
| Demonstrate the ability to generate and read schematic drawings and apply that knowledge to understand the operation of a physical circuit. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Construct, modify, and test an opeerational multistage digital or analog circuit. | P | P | P | P | P | P | P | P | | | P | P | P | S | P | P | | | | | | | | | | | | | |
| Follow the flow of an automated manufacturing process, recognize the transducers used to monitor a process and, using programmable controllers (PLCs), ladder logic and robotics, create, test and troubleshoot an automated process. | | | | | | | | | | | | P | P | S | P | | P | | | | | | | | | | | | |
| Demonstrate the operation of a microprocessor based system, write low level code, assemble and troubleshoot a personal computer. | | | | | | | | | P | P | | P | P | | | | P | | | | | | | | | | | | |
| Interpret the concepts of a problem-solving task to troubleshoot a faulty circuit. | S | S | S | S | S | S | S | S | P | P | S | S | S | S | S | S | S | | | | | | | | | | | | |
| Access library, computing, and communications services and obtain information and data from regional, national, and international networks. | | S | | | | | | | S | | | | | | | | | | | | | | | | | | | | |
| **Core Abilities** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Communicate effectively. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | P | | P | | | | | | |
| think critically and solve problems effectively | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | p | p | s | | s | p | | | | | |
| Increase understanding of the relationship between self and community, including self-awareness and personal responsibility. | | | | | | | | | | | | | | | | | | P | | | | | | S | | | | | |
| Explore academic disciplines of liberal arts, social sciences, and physical sciences. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Learning College Principles** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Learners are active partners in the learning process. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Learners are self-directed. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Multiple learning options for diverse learners. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Learning is promoted across organizational boundaries. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Learning is substantive and documented. | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| **Assessment Methods** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Technical Skill Performance Observation/Evaluation | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Employability Skills Evaluation | | | | | | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | P | | | | | | |
| Group Project | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Journaling | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Library Research | | | | | | | | | S | | | | S | | S | | | | | | | | | | | | | | |
| Oral Report/Presentation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Peer Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Portfolio | | | | | | | | | | | | | | | S | | | | | | | | S | | | | | | |
| Pre and Post Test | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Project Evaluation | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Quizzes | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | | | | |
| Self Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Written Report | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Written Tests/Examinations | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | P | | | | | | | | | |

**P** = this is a primary course for meeting the program learning outcome, core ability, learning college principle, or assessment method.
**S** = this course meets some of the program learning outcome, core ability, learning college principle or assessment method.

# Advanced Technology Division – Assessment Plans 9/22/05

## Electronics

| Program Learning Outcomes/Goals | Assessment Indicators |
|---|---|
| 1) Demonstrate employability skills required for initial employment and advancement in the industry that include: attendance, proper attire, customer relations, following directions, working in teams, and understanding work rules and ethics. | 80% of the first year students will qualify for the "select student" status by receiving a recommendation from a full-time contracted faculty member. 90% percent of the second year students will complete their programs in the "entry level employee" status. Criteria to qualify for the "select" status will be determined and published by the faculty prior to the start of the academic year. |
| 2) Demonstrate safe work practices and tool usage while performing operations in a shop environment. | 95% of all students will pass a shop safety written and demonstration test. |
| 3) Demonstrate the ability to generate and read schematic drawings and apply that knowledge to understand the operation of a physical circuit. | First term progress in understanding electronics:<br>Each student will create a schematic from a circuit layout, calculate the total current and total resistance of the circuit<br>Demonstrate the Use of test equipment to measure the circuit voltage, current and resistance to the instructor.<br>The results are documented in the lab experiment writeup.<br>Students continue working on the project until they are successful.<br>The student can assess their progress by how long it takes to succeed in completing the assignment.<br><br>Second year microcomputer applications class:<br>The outcome is the student can successfully demonstrate the ability to build an electronic circuit and interface the circuit to a microcontroller by writing the computer code.<br>Each student will have taken the linear circuits class previous to the microcomputer class.<br>The student will demonstrate the ability to build a circuit from a schematic.<br>The circuit is then tested for proper operation to measure temperature and convert the temperature measurement to a digital value.<br>The electronic hardware will be demonstrated to the instructor.<br>The students will write the computer code to interface the analog circuit to a microcontroller and give warning indications when the temp is too high or too low.<br>The students will then demonstrate the completed project to the instructor.<br>Documentation is the final hardware and computer code attached to the lab write-up.<br>The student can assess their progress in the program by the amount of difficulty in succeeding with the project. |

| | |
|---|---|
| 4) Construct, modify, and test an operational multistage digital or analog circuit. | All students will design, construct, test and present a project prior to completing the program |
| 5) Follow the flow of an automated manufacturing process, recognize the transducers used to monitor a process and, using programmable controllers (PLCs), ladder logic and robotics, create, test and troubleshoot an automated process. | All students will design, construct, test and present a project prior to completing the program. |
| 6) Demonstrate the operation of a microprocessor based system, write low level code, assemble and troubleshoot a personal computer. | All students will assemble and troubleshoot a personal computer and demonstrate the knowledge of low level coding prior to completing the program. |
| 7) Interpret the concepts of a problem-solving task to troubleshoot a faulty circuit. | All students will troubleshoot a faulty circuit while explaining the principle electronic concepts. |
| 8) Use appropriate library and information resources to research professional issues and support lifelong learning. | All students will conduct research with citations in a written report in both the first and second year of the program. |

**First term progress in understanding electronics:**
Each student will create a schematic from a circuit layout
calculate the total current and total resistance of the circuit
Demonstrate the Use of test equipment to measure the circuit voltage, current and resistance to the instructor.
The results are documented in the lab experiment writeup.
Students continue working on the project until they are successful.
The student can assess their progress by how long it takes to succeed in completing the assignment.

**Second year microcomputer applications class:**
The outcome is the student can successfully demonstrate the ability to build an electronic circuit and interface the circuit to a microcontroller by writing the computer code.
Each student will have taken the linear circuits class previous to the microcomputer class.
The student will demonstrate the ability to build a circuit from a schematic.
The circuit is then tested for proper operation to measure temperature and convert the temperature measurement to a digital value.
The electronic hardware will be demonstrated to the instructor.
The students will write the computer code to interface the analog circuit to a microcontroller and give warning indications when the temp is too high or too low.
The students will then demonstrate the completed project to the instructor.
Documentation is the final hardware and computer code attached to the lab write-up.
The student can assess their progress in the program by the amount of difficulty in succeeding with the project.

# Program Operating Analysis - FY 2006

## Electronics

| | Fiscal Year 2006 | Expected Model | Actual | Difference | IRAP | Analysis |
|---|---|---|---|---|---|---|
| 1 | **Enrollment** | **H** | | | | High, Medium or Low Cost Program |
| 2 | Reimbursable Student FTE | 39.00 | 48.98 | | 46.5 | 510 contact hours = 1 R-SFTE |
| 3 | Credit Hour Student FTE | 26.63 | 33.44 | | 33.4 | 45 Credit Hours = 1 CrdHr-SFTE |
| 4 | **Staffing** | | | | | |
| 5 | Full-time Equivalent Faculty | 2.396 | 2.000 | -17% | | Actual = Enrollment Reports FY06 |
| 6 | Part-time Equivalent Faculty | 0.266 | 0.663 | 149% | | Actual = Enrollment Reports FY06 |
| 7 | **Total Faculty FTE** | **2.663** | **2.663** | **0%** | | |
| 8 | **Budget** | | | | | |
| 9 | FT Faculty Dollars | 146,782 | 123,620 | -16% | | Actual = Banner FY06, Period 14 |
| 10 | PT Faculty Dollars | 10,601 | 30,932 | 192% | | Actual = Banner FY06, Period 14 |
| 11 | Lab Assistant Dollars | 13,313 | 7,492 | -44% | | Actual = Banner FY06, Period 14 |
| 12 | OPE | 87,264 | 81,954 | -6% | | Actual = Banner FY06, Period 14 |
| 13 | Materials and Supplies | 10,651 | 8,250 | -23% | | Actual = Banner FY06, Period 14 |
| 14 | Equipment | 13,313 | - | - | | Actual = Banner FY06, Period 14 |
| 15 | **Direct Instruction Costs** | **281,925** | **252,248** | **-11%** | **232,254** | **Expenses are lower than expected.** |
| 16 | **Operating Ratios** | | | | | |
| 17 | R-SFTE/Total Faculty FTE | 14.65 | 18.40 | 26% | | |
| 18 | **CrdHr-SFTE/Total Faculty FTE** | **10.00** | **12.56** | **26%** | | **Faculty are serving more students.** |
| 19 | Cost / R-SFTE | 7,229 | 5,150 | -29% | 4,993 | |
| 20 | Cost / CrdHr-SFTE | 10,588 | 7,543 | -29% | | **Cost per student is lower than expected.** |
| 21 | | | | | | |
| 22 | **Revenue** | | **Revenue** | **Difference** | **IRAP** | |
| 23 | Tuition | | 97,060 | | 100,004 | FY06 Tuition Rate x CrdHr SFTE x 45 |
| 24 | Program Fees (Differential) | | 30,096 | | 29,819 | Credits Hours x 45 x $20.00 |
| 25 | Public Support / CrdHr SFTE | 3,807 | 186,467 | | 177,283 | RFTE*$3,807 |
| 26 | Other Instructional Revenue | | | | | |
| 27 | **Total Operating Revenue** | | **313,622** | | **307,106** | Contribution to Total College Revenue |
| 28 | Instructional Function Revenue | 54.5% | 170,924 | | | Based on Model's Functional Cost Ratios |
| 29 | **Direct Instruction Revenue** | **83.3%** | **142,377** | **-44%** | | **Expenses are Greater than Revenue** |
| 30 | | | | | | Faculty, Lab Assts, M&S, Equip Costs |
| 31 | Indirect Instruction Revenue | 16.7% | 28,547 | | | Portion of indirect instructional costs |
| 32 | Other Functions Revenue | 45.5% | 142,698 | | | Student Svs, College Svs, etc. |