

# Slot Technology

**COURSE NUMBER:** ET 138B

**SEMESTER:** Fall, 2009

**CREDITS:** 3 (3,0,0,0)

**PREREQUISITES:** NONE

**TIMEs:** Saturday 9:00 AM - 11:50 AM

**TEXT:** TBA

**OTHER REQUIRED MATERIALS:** TBA

**WEB:** <http://sites.csn.edu/jmiller>

**OFFICE HOURS and E-Mail:** Per <http://sites.csn.edu/jmiller>

## COURSE DESCRIPTION:

An introductory course in the design, theory and operation of electronic slot machines. Students will be exposed to the theory and operation of electronic slot machines.

## SAFETY:

The electronics technician works with electrical and electronic devices. Test instruments are used to measure the electrical characteristics of these components and their respective circuits. There are many tasks that are involved with the technicians work. Even though these tasks are interesting and challenging, they may involve certain hazards if the technician is careless concerning work habits. It is essential that every student learn and practice the principles of safety.

"The primary safety rule for general shop and the electronics laboratory is: **THINK BEFORE YOU ACT - DON'T CLOWN AROUND!** Safety is everyone's responsibility. Everyone must cooperate to create the safest possible working conditions."

## **GENERAL LABORATORY SAFETY PROCEDURES:**

- **NO SMOKING** in the building - Nevada State Law.
- **Keep** the work **bench** in a **neat and orderly** fashion.
- Extraneous items of jewelry should be **removed** before applying power to a circuit. This includes **ALL rings and ALL watches**.
- **No food or beverages** will be allowed on the work station.
- **Keep aisles clear.** Keep doors and drawers closed after obtaining necessary materials.
- **Inspect** the work station for safety hazards. Inspect test leads and hook-up wires for cuts, nicks, and exposed wire. Inform the instructor or lab assistant

of any hazards that are found.

Your instructor will inform you of additional safety rules that must be adhered to.

### **ELECTROSTATIC DISCHARGE (ESD):**

ESD is a problem all technicians and engineers must be aware of. All bench work will be accomplished at ESD protected work stations.

### **DISABILITIES:**

If you have a documented Disability that may require assistance, you will need to contact the Disability Resource Center (DRC) for coordination of your Academic Accommodations. The DRC is located in Student Services in the 1100 area on the Cheyenne Campus. The phone number is 651-4700.

For those students that would like to earn a little extra cash, stop by the DRC to fill out a job interest card. This office hires students as note takers, proctors, scribes, and research assistants as needed.

### **RETENTION:**

Helping you survive and succeed in college is what Retention is all about. Did you know that CCSN has a wide array of services and programs to help make your experience at CCSN be a successful and rewarding one? The office of Retention can help you get or stay on the right track. We offer:

- ◆ **Coyote Student Coaches** offer **free tutoring** on a walk-up basis during posted hours in many subjects. Student Coaches are available in the D Lobby at West Charleston, the Student Lounge at Cheyenne and in the C Building at Henderson.
- ◆ **E-ALERT!** Is CCSN's academic early warning system. Professors identify students who need help and/or students who are having trouble in their classes may set up an appointment and receive help.
- ◆ **Free Success Planning Appointments** are available. The staff of the Retention Office is committed to helping you succeed at CCSN by sitting down with you, assessing your needs and getting you plugged in to CCSN's many resources.

### **GRADING SCALE:**

A: 90 - 100%, B: 80 - 89%, C: 70 - 79%, D: 60 - 69%, F: <60%

### **GRADING POLICY:**

Quizzes: 25%, Midterm Exam: 30%, Final Exam: 35%, Participation 10%

### **Attendance Policy:**

College enrollment assumes maturity and seriousness of purpose. Students are expected to attend each meeting of every course for which they have registered. A student may be administratively dropped from a course for excessive absences. Under no circumstances will an absence, for any reason, excuse the student from completing all works assigned in a given course. After an absence, it is the student's responsibility to check with the instructor about completion of missed assignments.

### **Personal Communicators:**

Cell phones and pagers must be **turned off or put in silent mode** during class. Only emergency services personnel (ON CALL) may keep their communicators on.

### **Course Content:**

1. Slot Machine Components
2. Machine Styles
3. Block Diagram
4. Modes of Operation
5. RAMs and ROMs
6. Embedded Microprocessors
7. Random Number Generators
8. Dollar Bill Validator (DBV)
9. Coin Comparitors
10. Hoppers
11. Reel Motors and Mechanisms
12. CRT Displays
13. Statistical Recall

## **COURSE OUTCOMES:**

At the completion of the course, the student will be able to:

1. Demonstrate a working knowledge of embedded microprocessor systems.
2. Explain the difference between ROM, PROM, EPROM, and RAM
3. Explain the theory of operation of a typical electronic slot machine.
4. Describe the modes of operation of a slot machine.
5. Explain the coin-in assembly.
6. Explain the coin-out assembly.
7. Identify external and internal components.
8. Show proper ESD prevention.
9. Demonstrate proper safety precautions.
10. Describe the operation of peripheral devices.

## **METHODS OF EVALUATION COURSE OUTCOMES:**

1. Examinations
2. Quizzes

## **WEEKLY TOPIC AND SCHEDULE:** [\(See Learning Modules for details\)](#)

Week1: **Introduction to course**

### [Learning Module 1](#)

Purpose of course - course outline

Safety (Appendix C)

ESD (Appendix B)

History of gaming machines (1.1.1.1) (Time line)

Glossary

Week 2: **Quiz 1** (Safety and ESD)

### [Learning Module 2](#)

**I. Types of gaming machines** (1.1.1.2)

Machine components                      Types of games

**II. Machine styles** (1.1.1.3)

Slant top                                      Round top

Upright                                        Bar top (Flat top)

**III. Manufacturers of gaming devices (web sites)** (1.1.1.8)

**IV. Lab/Demo:** Students will find identify various parts and subassemblies on assorted EGMs.

Week 3: **Quiz 2** (Machine components, games, styles)

[Learning Module 3](#)

**I. Block diagram and theory of operation and modes of operation of electronic slot machines (2.1.1.1)**

**II. Lab/Demo:** The students will remove the printer and load paper

Week 4: [Learning Module 4](#)

**I. Block diagram and theory of operation and modes of operation of electronic slot machines discussion is continued along with a discussion of Embedded microprocessors. (2.1.1.6)**

**II. Labs/Demo:** The students locate the Microprocessor board in various EGMs and place the machine into the service mode. They will also place the machines into the attendant mode and note the differences between them.

Week 5: **Quiz 3** (Block diagram and modes of operation)

**Memory devices (Chapters 3-5)**

[Learning Module 5](#)

**Lab/Demo:**

1. The students identify various memory chips (especially EEPROMs on EGM processor boards. S+ and an I-Game processor boards will be used.
2. A demo on Key Chipping a will be performed.

Week 6: **Quiz 4** (Memory Devices)

**Peripherals & Midterm Review**      [Learning Module 6](#)

1. Coin comparator (6.1.1.1)
2. Dollar Bill Validator (DBV) (6.2.1.1)
3. Hoppers (6.3.1.1)

**Lab/Demo:**

1. Hoppers
2. Test Equipment familiarization

Week 7: **Quiz 5** (Coin Comparators, Bill Acceptors, Hoppers)

**Peripherals**JCM UBA Maintenance Demo/Lab

[Learning Module 7](#)

Week 8: **Midterm Exam**

Week 9: **Peripherals** MEI Bill acceptor Demo/Lab

[Learning Module 9](#)

Week 10: [Learning Module 10](#)

**Peripherals**

Reel stepper motors (6.4.1.1)

Reel assemblies

Physical reel strips

Week 11: **Quiz 6** (Stepper Motors and Reel Assemblies)

**Pay Tables, PAR Sheets, and Random Number Generators (RNG)**

[Learning Module 11](#)

Week 12: **Quiz 7** (Pay Tables, PAR Sheets, and RNG)

[Learning Module 12](#)

**Peripherals**

CRT and LCD monitors (6.5.1.1)

Touch screen (6.5.2.1)

Week 13: **Quiz 8** (CRT, Touch screen)

[Learning Module 13](#)

**Meters**

Hard meters

Soft meters

**Maintenance and support** (Show movie)

Coin jams

Bill jams

Hopper jams

Player disputes (Coin in, Coin out, Bill validator)

Troubleshooting (Troubleshooting manual)  
Detecting cheating and machine tampering (Coin-on-a-string,  
stopping fan, coin-out optics, shaved coins, slugs)

**Lab/Demo:** Trouble shooting using I/O tests and Button removal, cleaning  
and installation.

Week 14: Post Class **Quiz 9** (Maintenance, Support, PSRs)

**Maintenance and support** (Continued) [Learning Module 14](#)

Statistical recall ( Chapter 4 Game Software)

Game recall

**Program Summary Report** (PSR)

**Lab/Demos:**

1. Customer Service Lab which covers such items as game recall and  
statistical data collection
2. Moving a Slot Machine

Week 15 **Conversions and Review for Final**

[Learning Module 15](#)

**Demo:** Keisub Electronics presentation on their LED replacements for EGM  
light bulbs

Week 16: **Final exam**