1. **Instructor:**
   John Kennedy  
   E101-C  
   Ph. 619-594-1053  
   Web: www.seniordesignlab.com  
   Email: kennedy.sdsu@gmail.com  
   Office Hours: Thursday 10:30 – 11:30  
   Support Session: EE397 Tuesday (11:00 - 11:50) E101-F

2. **Prerequisites:**
   COMPE375 - Embedded Systems Programming  
   EE330L - Engineering Electronics Laboratory  
   EE410 - Signals and Systems  
   EE430 - Analysis and Design of Electronic Circuits

3. **Class Time:**
   Lecture: Wednesday: 9:00am – 9:50am Rm. E423B  
   Lab: Wednesday: 10:00am – 3:40pm Rm. E217  
   Lab Demonstrations at 10:30am and 1:30pm

4. **Text and Materials:**
   1. Salt and Rothery:  
      *Design for Electrical and Computer Engineers,*  
      John Wiley & Sons, 2002  
      ISBN: 0471391468 (Amazon used around $10)

   2. Engineering Notebook: (Required for each student)  
      Suggested Type- 75 Sheets, 4x4 Quad., 11 ¾” x 9 1/4”  
      National Brand part # 43-648 (Available in the SDSU Book Store)

   3. Solderless BreadBoard: (Required for each student)  
      Recommend 830 Tie Points, 4 bus or larger (less than $10)

   4. PIC Microcontroller Programmer / Debugger (Optional - available in Lab)  
      PICkit 3- part # PG164130 from Microchip [25% off while in school]
5. **Purpose of this Course:** Preparation for a Team Based Capstone Design Project

*At the completion of the course, each student will have:*

a) a basic competence at reading a datasheet to make component selection decisions based on cost and performance criteria.

b) demonstrated proficiency at using laboratory equipment to test, tune and validate an electronic circuit.

c) demonstrated individual competence in designing and testing a mixed signal embedded system to meet a set of predefined performance specifications.

d) demonstrated the ability to interconnect electronic devices using synchronous serial communication protocols (SPI & I2C).

e) designed, documented and assembled a printed circuit board (PCB) using professional CAD tools.

f) an understanding of ethical and professional issues faced by engineers.

g) learned how to prepare an engineering design proposal with a clear statements of specifications, design criteria and deliverables.

6. **Individual Design Project:**

The required Mini-Project is to design, test and document a small electronic system capable of solving a simple task. A typical Mini-Project will contain a microcontroller, a sensor and some type of actuator or other output device. Each student will design and assemble a custom PCB to implement their design. Once the design is functional the student will evaluate the performance against a set of pre-defined specifications. The project will be documented in a written report and presented to the class in a short oral presentation.

To prepare for the individual design project a number of lab experiments and in-lab training sessions will be preformed. The lab experiments will be used to outline the steps involved in developing a closed loop feedback system using a microcontroller, instrumentation circuitry and a sensor.
7. **Professional Growth:**

Each student is responsible for participating in a minimum of two professional growth seminars throughout the semester. This requirement may be satisfied by attending the SDSU IEEE meetings or any other professional Engineering society meetings. A one paragraph synopsis of the topic covered in the meeting must be submitted to receive credit.

8. **Lecture and Lab Topics:**

a) Selection and Evaluation of Sensors and Transducers  
b) Op-Amps and Instrumentation Circuits  
c) Electronics Prototyping and Assembly Techniques  
d) Microcontroller Interfacing for Mixed Signal Environments  
e) Microcontroller Peripherals  
f) Embedded Communication Busses I2C & SPI  
g) Schematic Capture for PCB Layout  
h) Symbol and Cell Management for PCB Design  
i) PCB Design using CAD Tools  
j) System Design and Block Diagrams  
k) Project Management, Planning and Gnatt Charts  
l) Engineering Ethics

9. **Grading:**

*The approximate grading for the course is as follows:*

- 50% Individual Design Project, Documentation and Oral Presentation  
- 30% Lab experiments  
- 10% Attendance and Participation in class and Quizzes  
- 10% Ethics and Professionalism (Ethics and Professional Growth reports)
10. **Tentative schedule of throughout the semester:**

- Apr. 5: Project Selection Deadline
- Apr. 12: Project Performance Specifications Due
- Apr. 19: Engineering Ethics Report due
- Apr. 26: Oral Presentations & Project Evaluation
- May 3: Design Day – Evaluation of ECE490 and ECE496B Projects
- May 11: Final Mini-Project Report is Due by 4:00pm

11. **Students with Disabilities:**

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delays in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services