Senior Design Project – SDP18

Introduction
7 September 2017

C.V. Hollot
Professor and Head

Baird Soules
Sr. Lecturer and Director of Experiential Learning
SDP18 Clock Starts Ticking

SDP18 Demo Day
27th-28th April 2018

393 days
372 days
232 days
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<tbody>
<tr>
<td><strong>Last Name</strong></td>
<td><strong>First Name</strong></td>
<td><strong>Date:</strong></td>
<td><strong>CSE 14-18</strong></td>
<td><strong>CSE 14-18</strong></td>
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<tr>
<td><strong>First Year</strong></td>
<td><strong>Second Year</strong></td>
<td><strong>Third Year</strong></td>
<td><strong>Fourth Year</strong></td>
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<tr>
<td>Fall (15 cr)</td>
<td>Spring (16 cr)</td>
<td>Fall (18-19cr)</td>
<td>Spring (19-20 cr)</td>
<td>Fall (12-14cr)</td>
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<td>Thematic Elective [1 or 4 cr] [Note 3]</td>
<td>BIOLOGY110 [4 cr] [Note 1]</td>
<td>ENG112 Intro. to ECE [3 cr] [Note 4]</td>
<td>5-yr B.S. / M.S. Graduate Course [3 or 4 cr] [Note 5]</td>
<td>5-yr B.S. / M.S. Graduate Course [3 or 4 cr] [Note 6]</td>
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*The curriculum notes can be found on the reverse side of this worksheet.*

UMass Amherst • Department of Electrical and Computer Engineering

http://ece.umass.edu/ Updated March 2015
Students Empowered

- Select your own team
- Select your own project
- Select your own advisor
- Empowerment
- Responsibility
Course attributes

- Idea $\rightarrow$ prototype (year-long hackathon)
- Ideas self-generated
- Teams self-form
- Self-learning opportunities
- **Teaming experience**
- Impact on society
- Pre-professional experience in engineering design
- **Minimal classroom interactions**
  - Weekly team/advisor meetings
  - Reviews before faculty evaluators
Takes a Department to do SDP

- Team Member #1
- Team Member #2
- Team Member #3
- Team Member #4

Faculty Advisor

- Faculty Evaluator #1
- Faculty Evaluator #2

COO

CTO

CLT

ECE Department
Baird Soules

M5, Room 5J
SDP18 Reviews (the drumbeat)

Making the Pitch
- Preliminary Design Review (PDR) - Oct

Demonstrating the Essence
- Midway Design Review (MDR) - Nov

Working Prototype
- Comprehensive Design Review (CDR) - Feb

THE Prototype
- Final Project Review (FPR) - April

Block Diagram

SDP Demo Days 27th, 28th April
SDP18 Course Deliverables

- Project Website
- Review Presentations
  (PDR/MDR/CDR/FPR slide decks)
- Written report
- Demo Poster
- System Prototype
Must include custom PCB

Examples

- 8-bit microcontroller
- sensor board (signal conditioning, intelligence)
- actuator board (power stage)
- power supply
SDP18 Process

- Teams of 4 students
  - Choose one team manager
- Advisor
  - Each team chooses its own ECE faculty advisor
- Meetings
  - Weekly team meetings
  - Weekly advisor meetings
  - Course meetings
- Project budget: $500
  - Some parts available in SDP lab or M5
  - We encourage students to secure outside support; e.g., free samples, sponsorships, competitions, ...
Review and Grading Process

- Reviews (PDR, MDR, CDR, FPR)
  - Two ECE faculty evaluators (different from advisor)
  - 20/30 min presentation by team + 20 min Q&A

- The final grade for ECE 415 (and ECE 416):
  - Advisor grade (50%): Given at the discretion of the advisor
  - Review Board grade (30%): Average of review panel grades
  - Course Coordinator grade (20%): Based on project documents and performance
  - Each team member graded individually.
SDP18 website  http://www.ecs.umass.edu/ece/sdp/sdp18/
Honorable Mention

SAFE Drone

Bradley Marszalkowski, Jamie Kline & Serena Thomas

Advisor: Bill Leonard
Honorable Mention

SAFE Drone
Honorable Mention

AutoUmp

Tim Adams, Justin Marple, Jason Camiel & Matt Barnes

Advisor: Tilman Wolf
Honorable Mention

AutoUmp
SDP17 Third Place

Pegasus-21

Trevor Berry, Istvan Kreiz & Keith Miller

Advisor: Zlatan Aksamija
SDP17 Third Place

Pegasus-21
SDP17 Second Place

Smart Hydroponic Greenhouse

Michael D'Anna, Samantha De Groot, Maxwell Joyce & Shaun Palmer

Advisor: Bob Jackson

ECE Department
SDP17 Second Place

Smart Hydroponic Greenhouse

Sensor Array
- Moisture
- pH
- Humidity
- Temperature
- Water Level

Hydroponics
- Pump/Water Cycle Control
- Nutrient Dispersal System

Lighting
- Voltage Regulators and Power Management
- Light Cycle and Intensity Control

Android Application
- Plant Database
- Notification Interface
SDP17 First Place

Step

Joseph Roberts, Ryan Daly, Jared Ricci & Steven So

Advisor: Dennis Goeckel
SDP17 First Place

Step
Assignment

- Converge on project (ok to consult with adviser)
- Reserve lab bench, Monday, 11\textsuperscript{th} Sept’17
- Confirm faculty adviser by Tuesday, 19\textsuperscript{th} September’17
Career planning

- Engineering Career Development and Experiential Learning Center (Cheryl Brooks), Marston 112
  - Walk-in resume/cover letter help
  - Mock interviews (by appointment)
11:00 - 2:00 Handshake Launch
5:30 - 6:30 Resume and Career Prep Workshop
10:00 - 3:00 Engineering & Computer Sciences Career Fair
Projects

- What do you want to learn?
- Choose an area – become an expert
- Explore past SDP projects
  - UMass
  - Other ECE departments
- SDP projects are:
  - differentiators at job interviews
  - not PhD dissertations
Real-Time Concussion Analyzer (SDP13)
Hologram Machine (SDP14)
**Finger Tracking**

1. Linear IR Laser Beam ~790nm
2. A finger breaks the IR beam
3. IR Camera sees finger reflection

Before

After
braillebook (SDP16)
SigninGlove (SDP16)
ASPECTS (SDP16)

ECE Students Win First Place in FAA Design Competition By Creating Virtual Geofences to Protect Airports from Drones

The student team of UMass electrical engineering major Alex Breger, Chris Bracci, Jason Denis, and Sandra McQueen received first place for their winning design in the "Runway Safety/Runway Incursions/Runway