Engineering Program

EGR 103

Fundamentals of Engineering Design

SYLLABUS

Fall 2016
Syllabus for

EGR 103  Fundamentals of Engineering Design

LEC INSTRUCTOR: __________________ OFFICE: _______ PHONE: (856)-222-9311 ext. _____
LAB INSTRUCTOR: __________________ OFFICE: _______ PHONE: (856)-222-9311 ext. _____

SEMESTER CREDIT HOURS: 3;     Pre or Co-Requisite: ENG 101.

COURSE DESCRIPTION:
This course involves interdisciplinary teams of students working on engineering design projects. Electronic and mechanical topics along with schematic drawing software are incorporated in lecture and lab modules, and are designed to give students the skills to design, build, document, and present a working project. Projects have elements of Electronic and Mechanical Engineering design. Each team prepares a written report, gives an oral presentation, and demonstrates their project.

RATIONALE:
EGR103 Fundamentals of Engineering Design is a 1st Term Freshman Engineering course required for the RCBC A.S. Degree in Engineering, Drexel's BS degree in Engineering or Engineering Technology and NJIT’s BS degree in Engineering and Engineering Technology.

The RCBC A.S. degree in Engineering can be transferred to most local 4-year engineering colleges including Drexel, Univ. of Penn., NJIT, and FDU to obtain a B.S. Degree in Engineering

REQUIRED TEXT & One 3-Ring Binder:
No text is required for this course. Students are expected to use this savings (approximately $100 per student) toward the cost of project construction) and a RC car. The group only needs to buy wood, pneumatic parts, sprockets, chains, pulleys, belts etc. All projects will be kept by the college for ABET Accreditation.
One 3-Ring Binder is required for Lec., HW, Labs and Project Guide.

COURSE MEETINGS: - Two days per week for 3 Hours each

PART I – First 2/3 of Term
(Project construction is done outside of class)

1ST DAY: 2 Hours for Lecture & HW Question/Answer session
1 Hour for Project discussion.

2ND DAY: 3 Hours for Lab.

PART II – Last 1/3 of Term
Both Days
1) Finish project construction,
2) Project Interfacing,
3) Create drawings,
4) Report writing,
5) Preparing presentation,
6) Project presentation before Judges, and
7) The Race.
EVALUATION:

A. (3 absences for a 2 day per week class) or (5 absences for a 3 day per week class) are permitted per term. Students are expected to be on time and stay for the full duration of the class, otherwise they may be marked absent. If a student’s absences exceed 3 days for a 2 day per week class (10% ) or 5 days for a 3 day per week class (10%), the instructor may impose a penalty of up to 10%.

B. Academic misconduct that disrupts the learning process in class, such as excessively leaving the classroom for cell phone conversations, can affect the final grade.

C: Test / HW / Lab % of Final Grade

| Test 1 Grade | 12.5% |
| Test 2 Grade | 12.5% |
| Test 3 Grade | 12.5% |
| HW Average Grade | 12.5% |
| Lab Average Grade | 12.5% |

<table>
<thead>
<tr>
<th>The Project % of Final Grade</th>
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<tr>
<td>6) Outside Judges Grade 12.5%</td>
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<td>7) Project Report Grade 12.5%</td>
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<td>8) Self Evaluation Grade 12.5%</td>
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CALCULATION of FINAL GRADE average
Add up all 8 grades and ÷ by 8

FINAL GRADE based on Final Grade Average

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<tr>
<th>Grade</th>
<th>Range</th>
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<tbody>
<tr>
<td>A</td>
<td>100 to 90</td>
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<tr>
<td>B+</td>
<td>89 to 85</td>
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<tr>
<td>B</td>
<td>84 to 80</td>
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<tr>
<td>C+</td>
<td>79 to 75</td>
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<tr>
<td>C</td>
<td>74 to 70</td>
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<tr>
<td>D</td>
<td>69 to 65</td>
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<tr>
<td>F</td>
<td>below 65</td>
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The Electronics Engineering Technology program, which has a Computer Servicing & Networking Technology option, is accredited by the Engineering Technology Accreditation Commission (ETAC) of ABET

ABET • 415 North Charles Street, • Baltimore, MD 21201 • Phone: (410)-347-7700
http://www.abet.org

The Electronics Engineering Technology program and Computer Servicing & Networking Technology option

Program Mission Statement

The mission of the Rowan College at Burlington County Electronics Engineering Technology Program and Computer Servicing & Networking Technology Option is to produce graduates who are able to obtain employment as a technician or transfer to a four-year college. In addition, our graduates will be technically competent, able to communicate effectively, work well with others and demonstrate professionalism.

Program Educational Objectives

“The Electronics Engineering Technology program and Computer Servicing & Networking Technology option prepare graduates who, during the first few years after graduation, should be able to:

1. Establish productive careers utilizing technical and professional skills to support design, implementation, application, manufacturing, sales and maintenance of electrical, electronic and computer systems.

2. Participate in life-long learning and continuous improvement opportunities through the pursuit of advanced degrees and other professional development opportunities.

3. Demonstrate awareness of the ethical responsibility of the profession in a diverse global environment.”
**Student Outcomes**

Graduates of the Electronics Engineering Technology Program and Computer Servicing & Networking Technology Option should be able to:

a. apply the knowledge, techniques, skills, and modern tools of the discipline to engineering technology activities;

b. apply knowledge of analog and digital electronics, computers, networks, mathematics and science to technical problems or projects;

c. conduct standard laboratory tests and measurements, and to analyze and interpret experiments;

d. function effectively as a member of a technical team;

e. identify the characteristics of, analyze and solve technical problems;

f. apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to use appropriate technical literature;

g. express the need for continuing professional development thru conferences, seminars, courses and the pursuit of advanced degrees;

h. express a commitment to address professional and ethical responsibilities, including societal and global issues and a respect for diversity; and

i. recognize a commitment to quality, timeliness and continuous improvement.

j. apply circuit analysis and design, computer programming, associated software, analog and digital electronics, and microcomputers, and engineering standards to the building, testing, operation, and maintenance of electrical/electronic(s) systems.

k. apply the principles of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry.

* Outcomes j. and k. are program specific outcomes from the document: CRITERIA FOR ACCREDITING ENGINEERING TECHNOLOGY PROGRAMS: Effective for Reviews During the 2014-2015 Accreditation Cycle and are not part of the general ABET Student Outcomes (a. -i.).
EGR 103

Course Outcomes with Performance Criteria

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<tr>
<th>Course Learning Outcomes</th>
<th>Performance Criteria: A minimum of 70% of students will achieve at least a 70% for the following activities:</th>
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</table>
| 1. Apply knowledge learned in the course and physics to creatively design and build an electronic/mechanical project | a) Team Capstone Design Project **Mechanical Report** (Rubric Section Grade)  
  b) Team Design Project **Mechanical Oral Presentation** (Rubric Section Grade)  
  Both evaluated with 2 separate Rubrics |
| 2. Function effectively as a member of a technical team | a) Team Capstone Design Project **Report Final Score** (Evaluated with Rubric)  
  b) Team **Evaluation Final Score** |
| 3. Communicate effectively through a written report and an oral presentation | a) Team Capstone Design Project **Report Final Score**  
  b) Team Design Project **Oral Presentation Final Score**  
  Both evaluated with 2 separate Rubrics |
| 4. Make improvements to project with a quality that it works reliably, and complete project on time. | a) Team Capstone Design Project **Mechanical Report**  
  b) Team Design Project **Project Construction & Demo**  
  Both evaluated with 2 separate Rubrics |

Contribution of Course Learning Outcomes to meeting Program Educational Objectives

Relationship of Course Learning Outcomes (#) to Student Outcomes (a, b, c…)

<table>
<thead>
<tr>
<th>Course Outcome #</th>
<th>Student Outcomes - Graduates should be able to:</th>
</tr>
</thead>
</table>
| 2               | d. function effectively as a member of a technical team,  
| 3               | f. apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to use appropriate technical literature  
| 4               | i. recognize a commitment to quality, timeliness and continuous improvement  
<p>| 1               | k. apply the principles of physics or chemistry to electrical/electronic(s) circuits in a rigorous mathematical environment at or above the level of algebra and trigonometry. |</p>
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Topic Details</th>
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<tbody>
<tr>
<td>1a</td>
<td>Go over Syllabus, past projects and In Class &amp; for HW - Each Student</td>
<td>Develops a Sketch with Description of a Project Idea. Instructor starts to discuss each student’s Sketch of Project Ideas individually.</td>
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<tr>
<td>2a</td>
<td>Lec 1A Gears, RPM, &amp; Torque Cal. and Belt &amp; Chain Drive Systems</td>
<td>Instructor continues to discuss student’s Sketch of Project Ideas individually.</td>
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<tr>
<td>2b</td>
<td>Lec 1B Motors, Solenoids, Pneumatics &amp; Safety Videos</td>
<td>HW due 1st day of Next Week. Instructor continues to discuss student’s Sketch of Project Ideas individually.</td>
</tr>
<tr>
<td>3a</td>
<td>Lec 2 Conduction, Current, Volt., Res., Ohm’s Law &amp; Power;</td>
<td>HW2 due 1st day of Next Week. Go over HW1. Discuss Project Ideas with those that were absent. &amp; Collect Sketches.</td>
</tr>
<tr>
<td>3b</td>
<td>Lab 2 Resistor Color Code, Measuring Resistance on a DMM and use of</td>
<td>Ohms Law to Determine Resistance. Collect Sketches from those that were absent. At Home, Instructor Groups similar sketches together.</td>
</tr>
<tr>
<td>4a</td>
<td>Lec 3 Alternating Current (AC)</td>
<td>HW3 due 1st day of 6th Week. Go Over HW 2 and Test 1 Review. Test 1 on 1st day of Next Week. Instructor puts grouped sketches on Board and Class votes on Final Project Ideas. Students Fill out Project Skills Form and Instructor Collects Form in Class.</td>
</tr>
<tr>
<td>4b</td>
<td>Lab 3 Introduction to the Function Generator and Use of the Oscilloscope to Measure AC Voltage &amp; Frequency.</td>
<td>For those that were absent, Fill out Project Skills Form and Collect Form in Class. At Home, Instructor forms 4 Teams from the Project Skills Forms.</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>(The Minimum Pace is 1 Unit per Week.)</td>
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<tr>
<td>5a</td>
<td>Lec 4 Properties of Capacitors, Inductors, and Diodes</td>
<td>Test 1 on Units 1 &amp; 2</td>
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<td>HW 4 due on 2nd day Next Week</td>
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<td>5b</td>
<td>Instructor Forms Teams for the Projects and Labs (Swap Cell Phone #’s)</td>
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<td>Lab 4 Capacitance and Diode Properties (Form Lab Groups according to teams)</td>
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<td>After Lab, Instructor gives out similar project sketches to each team.</td>
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<td>Teams Discuss Project Sketch &amp; Sequence of Events with instructor</td>
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<td>Teams Draw Final sketch of Project &amp; write an obstacle Sequence of Events.</td>
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<tr>
<td>6a</td>
<td>Lec 5A The Arduino Microcontroller Introduction</td>
<td>HW5 due 1st day of 8th week</td>
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<td></td>
<td>Go Over Graded Test 1 and Go over HW 3</td>
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<td>Teams Discuss Project Sketch &amp; Sequence of Events with instructor</td>
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<td></td>
<td>Instructor Gives Out Motors with built-in gear transmission &amp; Pneumatics</td>
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<td>Teams Start Mechanical Part of Project Construction at Home</td>
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<tr>
<td>6b</td>
<td>LEC 5B Analyze 3 Programs used to Control Various Types of EGR 103 Projects</td>
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<td>Lab 5 Type in Program relevant to your project and verify that it works on the Arduino</td>
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<td>Go over HW 4 and Review for Test 2 Test 2 on 1st day Next Week</td>
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<td></td>
<td>Teams Meet after Lab 5</td>
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<tr>
<td>7a</td>
<td>Lec 6 LED’s, Photo Transistors, Power Switching - MOSFETs, Relays &amp; Motor Reversal</td>
<td>Test 2 on Units 3 &amp; 4.</td>
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<tr>
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<td>HW 6 due on 1st day of Next Week</td>
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<td></td>
<td>Teams Meet after Test 2</td>
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<td>7b</td>
<td>Lab 6 The Light Activated Switch (Photo Gate) Triggering the Arduino controlling a Motor</td>
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<td>Bring in project for Inspection on 1st day Next Week</td>
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<td>Fill out the Individual Task form</td>
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<tr>
<td>Week</td>
<td>Topic</td>
<td>Details</td>
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<tr>
<td>8a</td>
<td>Lec 7 Digital Recording</td>
<td>Go over HW 5, Teams Meet and 1. Instructor Project Inspection of Mechanical Interfacing then bring home</td>
</tr>
<tr>
<td>8b</td>
<td>Lab 7 Build Digital Recorder and Playback System on a Protoboard and Record Music</td>
<td>Go over HW 6, Review for Test 3 on Units 5 &amp; 6</td>
</tr>
<tr>
<td>9a</td>
<td>Teams Meet</td>
<td>and 2. Instructor Project Re-Inspection of Mechanical Interfacing then bring home</td>
</tr>
<tr>
<td>9b</td>
<td>Lec 8 MultiSim Lec on Drawing Schematic of Arduino System Control Circuitry</td>
<td>Lab 8 Drawing Schematic of Arduino System Control Circuitry using MultiSim</td>
</tr>
<tr>
<td>10a</td>
<td>Start of Interfacing</td>
<td>3. On Project, mount wood board for the Protoboard then unmount &amp; label group name.</td>
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<tr>
<td>10b</td>
<td>TBA</td>
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<tr>
<td>11a</td>
<td>Electronic Interfacing (Electronic people Only)</td>
<td>Move Proto Board to Wood Board with the Barrier Strip, Mount AC relay &amp; connect proto board to Barrier strip using solid wires, Follow the wiring diagrams in the Project Guide packet. Others in group continue with drawings and writing reports based on Task form assignments. (Refer to the Project Guide packet for information on all drawings and report writing.) Also Draw all Block Diagrams in Word, Visio, or other. Need 2 People to do drawings and 1 to do reports and Power Point Bring in the Mechanical Assembly of the project that is Mechanically Interfaced to motor or Pneumatic Cylinder for the Next Class Meeting</td>
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<tr>
<td>Week</td>
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<td>11b</td>
<td>4. <strong>Instructor Re-checks the Mechanical Interface to the motor or Pneumatic Cylinder.</strong> And makes suggestions for improvement if necessary. <strong>Electronic people, temporarily</strong> mount wired Wood Board. Wire AC Relay, Motor or Solenoid, Limit Micro Switches if any, &amp; Photo Gate to the Barrier Strip using stranded wire. <strong>When finished Remove Wood Board</strong>. Other people, Continue drawings and writing reports. <strong>(Submit for comments)</strong> Bring project home to continue construction. Bring it back for next class meeting.</td>
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<tr>
<td>12a</td>
<td>5. <strong>Electronic people, temporarily</strong> Mount wired Wood Board containing Protoboard to Project. Use the Photo Gate to activate the motor or solenoid in the project. <strong>Remove Wood Board</strong>. Other People Continue drawings and writing reports. <strong>(Submit for comments)</strong> Bring project home to finish construction &amp; paint. Bring it back for next class meeting.</td>
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<tr>
<td>12b</td>
<td>6. <strong>On project continue with Final Electronic Interfacing.</strong> (Project stays) Continue with project, Drawings, Reports and Power Point <strong>(Submit for comments)</strong></td>
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<tr>
<td>13a</td>
<td>Finishing touches to Drawings, Reports, Power Point and project. (Project stays)</td>
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<td>13b</td>
<td>Practice Oral Presentations. Give Electronic copy of report, all drawings and Power Point to the instructor.</td>
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<tr>
<td>14a</td>
<td><strong>Final Oral Presentation</strong> and Submit Report of Project with Drawings to Outside Judges</td>
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<td>14b</td>
<td><strong>Race for Points</strong></td>
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<tr>
<td>15</td>
<td><strong>Final Exam Week</strong> (Make up tests and Labs)</td>
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</table>
Timeline for EGR-103 Projects.

Week 5
Form Teams for the Projects and Future Labs  (Swap Cell Phone #’s)

Week 6
Teams Draw final Sketch of Project & write obstacle function Sequence of Events

Week 7
Teams Meet after Lab, Project Interfacing & Fill out the Individual Task form

Week 8
Teams order parts, begin construction, Teams Discuss Theme Music selection

Week 9
Bring in project for Instructor Inspection of Mechanical Interfacing then bring home

Week 10
Bring in Project and Mount wood board, for Protoboard, to the project
Report writing & Preparing presentation

Week 11
Progress discussion with the Instructor.
  Use the Light Activated SW to activate motor or solenoid in the project
  Bring project home to continue construction.
  Report writing & Preparing presentation

Week 12
Bring project home to finish project construction and paint.
Create drawings

Week 13
Report writing & Preparing presentation

Week 14 Project presentation before Judges & Tech paper due
The Race
EGR-103 Fundamentals of Engineering Design
Weekly Design Project Progress Report       Date: _____ / _____ / _____

Team Designation (name of your project): ______________________________________

This report completed by ________________________________________________

<table>
<thead>
<tr>
<th>Team Member’s Name:</th>
<th>Activities this week:</th>
<th>Individual time devoted:</th>
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These Correctly Completed reports are worth an extra 5 points on any graded category (example; labs) for ALL team members.
COURSE MATERIALS

A. **Required Text:** NO text required for this course. Students are expected to use this savings (approximately $100 per student) toward the cost of project construction and a RC car. The group need only buy wood, pneumatic parts, sprockets, chains, pulleys, belts etc.

*All projects will be kept by the college for ABET Accreditation.*

B. **Required Calculator:** (Purchase)

A **Scientific Calculator** will be mandatory for this course.

*Cell Phone calculators are not allowed for tests!*

C. **Lectures:** (Purchase in RCBC bookstore for a nominal fee.)

D. **HW packets:** (Purchase in RCBC bookstore for a nominal fee.)

The HW Packet will generally include:

- Questions and problems to answer that follows the topics covered in Lecture.

E. **Laboratories:** (Purchase in RCBC bookstore for a nominal fee.)

For each unit there will be a laboratory covering the units topics.

Laboratories will generally include:

1. Objectives
2. List of Supplies
3. Introduction / Set Up
4. Protoboard Layout & Check-Off Sheet where applicable.
5. Data
6. Calculations and / or Questions
7. Conclusion

F. **Project Guide** (Purchase in RCBC bookstore for a nominal fee.)

Contains information necessary for project construction, drawings and report writing.

G. **One 1” Three-Ring Binders** (Purchase)

Put in this Binder The lecture, HW and Lab Packets.

H. **USB Flash Drive** – Bring to lab class.
Project Selection and Grading

The topic of the team’s project will be decided on jointly by the students and the instructor in consultation.

The instructor’s concern will be for the safety, size, complexity and appropriate nature of the project.

The project Presentation and Report counts ≈ 40% of the Final Grade.

The Project Grade will be determined by an outside panel of judges.

Projects Theme

The project involves building an interactive obstacle course for a Remote control car rally.
Each group must design and build one obstacle and sponsor one racecar.
The team that completes the course in the shortest time wins the race.

Project Goal and Operation

The goal of the project is to design and build an electronically controlled mechanically moving obstacle that is difficult to navigate for a remote controlled car. The RC car should be able to get thru the obstacle based on driver skill or chance, although multiple passes may be required. Generally 4 obstacles will be built with teams of 4 or 5 students. One obstacle will be allowed to destroy the RC car if it does not successfully make it thru that obstacle.

Projects Ideas from the Past

Elevator, Draw Bridge, Flip Plate, Rotating Turntable(s) or Platter(s), Overhead Tram, Shooting Balls, Car Crusher, Cable Car, Spinning Drum(s), and Rotating Boards (Windmill)

RC Car Specifications

Car must run on 6V (4-AA batteries) or 9V (6-AA batteries) or a rechargeable batt. pack.

Dimensions: 7” max L x 5” max W x 4” H ± 1”

Fully proportional steering and speed control is desirable but not required.

It is preferable to have all groups standardize on one model.

A car used last year was a Losi 1/24 scale 4WD MicroTruggy. LOSB0244T2 approx. $110.

The car should have a ground clearance of ≈ ¼ inch from the bottom of the motor housing to the ground. A SUV, Jeep or truck style is preferable over a conventional car style.
Take the 1/24-scale 4WD Micro Truggy with you wherever you go. Indoors or out, you’ll have a blast with this durable, easy-to-use micro. Everything you need to get up and running is included in the box, even the batteries and transmitter. This truck is based on the 1/8-scale SIGHT-T™ Truggy, so it comes with superstars parts, including a powerful micro motor, coil-over, oil-filled shocks, a long-lasting rechargeable battery pack and much more.

Product Specifications
Type: 4WD Micro Truggy
Scale: 1/24
Length: 6.13 in (156mm)
Width: 4.25 in (108mm)
Wheelbase: 4.18 in (106mm)
Weight: 5.3 oz (165g)
Chassis: Extended composite tub
Suspension: Independent 4-wheel
Speed Control: Electronic, fully proportional
Radio: Pistol-style AM 27Mz
Batteries: 4.8V 220mAh NiMH (included)
Charger: Peak wall charger (included)
An Amazon.com search for “WL RTR Truck” will yield a very limited result. Look for the Truck with the **1:24 Scale**.
Sky Walker 1306 4 CH RC Quad Copter 2.4ghz Ready to Fly (Green)

by DSstyles

54 customer reviews | 11 answered questions

Price: $44.99 + $5.29 shipping

In Stock.

Ships from and sold by UJ Toys Co.

Color: Green

- Ready to fly indoor and outdoor; Durable material with super lightweight chassis and latest 6-axis gyro ensures stable performance; Specially designed canopy for more protection; Highly modular frame allowing easy replacement of spare parts
- 2 flight speed modes for both beginners and; experts; 3D flight. Can fly up and down / forward and backward / turn left and right / left and right drift / climb walls, ceilings and crawl across the floor
- 2.4Ghz 4 channels transmitter with trim. Strong anti-interference performance ensures long distance control; USB charging cable allows charging via computer; 3.7V 300mAh battery; With LED light, perfect for night flight
- Flight time (min): Approx 5-8; Range (m): Approx 50; Charging time (min): Approx 60; Size of quadcopter body (cm): 19(L) x 19(W) x 5(H); Size of protection frame (cm): 23(L) x 22(W) x 22(H)
- Package included: Aircraft x 1; Controller x 1; Li Battery x 1; Propellers x 2 set (one set is pre-installed, the other is spare); USB Cable x 1; 4 Pcs 1.5V AA batteries (NOT included) are required for transmitter; Suitable for: Ages 14+; Free DSstyles.com touch screen stylus pen is included (Random color shipped)
Project Specifications

1. Should have elements of Electronic, & Mechanical Engineering design aspects. The project can be driven by an electric motor (motor can be reversible), Pneumatic Cylinder, or Solenoid activated spring loaded or gravity driven device.

2. All projects will use a photogate, so that when a RC car drives over, it will activate the electronic control circuitry (turning on the motor solenoid or air valve and will also turn on the digital recorder which will play the theme song for the project.

3. Maximum Project Size is: **24” wide, 30” high, 36” long**, Not including Ramps. May have two sections (not including ramps) if necessary. Ramps should have a 10° incline maximum and be 12 to 15” wide. Mechanical operation area if on bottom = 6” H max; if on top = 30” H overall.

4. 1 voice chip, 1 Optoswitch (Photo Gate), and 1 large protoboard shall be used. A **maximum** of 2 micro switches (for limit end stop SW) & 1 motor (15 to 60 rpm) (Motor can be reversible) AC motors have more power than DC motors or 1 solenoid and / or 2 springs or 2 Cylinders & 1 Air Valve

5. Electronics must operate off (6 Volts DC) and must use separate DC supply for the DC Motors, except for AC Motors or AC solenoid, which use 120 V_{AC}. Must use an external Relay Off the protoboard to SW the 120Vac to the motor, Air valve or solenoid.

6. Electronic control circuitry shall have 1 delay circuit (Controls how long project stays on for or provides a delay until solenoid is activated. 1 555 Timer for cycling ON/OFF operation.

7. Carpet should be glued to the bottom to protect the bench tops.

Instructions for developing Obstacle Project Idea Sketches

Should have:

1) Name of obstacle
2. Isometric or Top, Front & Side view Sketch of Obstacle drawn neatly
3. Sketch of Mechanical Drive system drawn neatly
4. Description of how project works that includes:
   Sequence of events starting with driving over a photo gate & including any delays
   Motor Interface - How attach motor shaft to project?
   (Use of a sprocket / chain drive or a pulley belt drive system?)
Rules for Project Construction

1. Do not use metal frames - only wood and wood by-product frame materials.

2. Mechanical work area under project should be a maximum of 6” high.

3. Do not use nails to attach parts – only use Phillips flat head wood, deck or drywall screws.

4. All screw heads are to be recessed or countersunk so heads don’t stick out and are below the wood surface.

5. Hot Glue a section of carpet to the bottom of the project.

6. Source companies for parts and supplies can be found in Section 1 of the Project Guide here:
   http://bcc.edu/eet/additional-resources and under Program Resources click on the link: EGR 103 Project Guide (Section 1)

7. Technical references can be found here:
   http://bcc.edu/eet/technical-references
Project Contributions and Skills Survey  (Please Print)

Name:__________________________________________________  Section #: ______

Major: __________________________________________________

Project Contributions

Put a check mark if you have any of the following:

1) ___ Air Compressor with 5 Gal Tank (120Vac) that can bring to the college.

2) ___ Garage or Basement Workshop with a Bench
   If checked #2,  Town that live in ____________________________

3) ___ Power tools for woodworking

Project Skills

Put a Letter Grade for the following skills:

1) ___ Skills using Auto CAD or other CAD software to create Isometric drawings.

2) ___ Access to CAD Software

3) ___ Electronic Skills, and Protoboard construction

4) ___ Small Scale carpentry skills / Construction experience

5) ___ Mechanical Skills / Experience

--------------------------------------------------------------------------------------------------------------

6) ___ Skills using Power Point, Open Office, etc. to create Slide Show presentations.

7) ___ Skills writing Reports or technical writing skills

---------------------------------------------------------------------------------------------------------------

1st Project Choice:  ___________________________________________________

Your Idea?____

2nd Project Choice:  ___________________________________________________

3rd Project Choice:  ___________________________________________________
Determining the Final 4 Projects

All unique projects and Common Category projects (Ex: Turntables) will be put up on the board for a vote.

Each person can only vote once to determine the most popular ones. Ones with one or no votes are eliminated. A vote is taken again on what is left with each person only voting once. This may have to be done several times until the Final 4 Projects are determined.

Steps to Determine which group each student is assigned to from the Project Contributions and Skills Survey

1. Look for who checked off “Your Idea” on survey.

2. Put project name at top of this student’s survey.

3. Look for surveys that had workshop checked off and divide up among the 4 projects. Avoid picking Pemberton or Browns Mills for workshop.

4. Look for ACAD or other CAD skills to draw the mechanical drawings. Divide these students up among the 4 groups.

5. Look for Air Compressor checked off. Divide these students among the projects that use pneumatics.

6. Look for Electronic / Protoboard skills and divide up accordingly.

7. Look for small carpentry skills checked off and divide up so each group has 2 students if possible.

8. Look for mechanical skills checked off and divide up so each group has 2 students if possible.

9. Steps 1 thru 8 usually involves 3 to 4 students per group. Any that are in a group that have that project as a third choice or did not choose that project, see if can swap with someone in another group with comparable skills.

10. Assign the remaining students to groups based on their 1st and 2nd choices if possible.
EGR 103 Project Report and Oral Presentation Responsibilities

Project Title: ____________________________________________________________ Section: ___

Project Leader: ___________________________________________________________

Divide up responsibilities for the following tasks listed below that are applicable to your project.

Note: Each student will type a 1 page report on their contribution to the project for the judges to evaluate.

<table>
<thead>
<tr>
<th>Task</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Build mechanical part of project.</td>
<td>Everyone</td>
</tr>
<tr>
<td>2. Mechanical Isometric drawing with Dimensions</td>
<td></td>
</tr>
<tr>
<td>3. Schematic Drawings (Multisim) (Photo Gate and 555 Timer)</td>
<td></td>
</tr>
<tr>
<td>4. Schematic Drawing (Multisim) (Digital Recorder)</td>
<td></td>
</tr>
<tr>
<td>5. Electronic Block Diagrams (Word, Visio, or other.) (Photo Gate and Digital Recorder Diagrams)</td>
<td></td>
</tr>
<tr>
<td>6. Build Electronic Interfacing part of project.</td>
<td></td>
</tr>
<tr>
<td>7. Type report on how project works Mechanically</td>
<td></td>
</tr>
<tr>
<td>8. Type report on how Electronic circuit works</td>
<td></td>
</tr>
<tr>
<td>9. Parts list of Unique Mechanical Components</td>
<td></td>
</tr>
<tr>
<td>10. Write oral presentation of Mechanical Report for slides</td>
<td></td>
</tr>
<tr>
<td>11. Write oral presentation of Electronic Report for slides</td>
<td></td>
</tr>
<tr>
<td>12. Make Power Point slides for # 10 &amp; 11</td>
<td></td>
</tr>
</tbody>
</table>
College Policies:
In order for students to know their rights and responsibilities, all students are expected to review and adhere to all regulations and policies as listed in the College Catalog and Handbook. These documents can be accessed at http://www.rcbc.edu/publications. Important policies and regulations include, but are not limited, to the following:

- College Attendance Policy
- Grading Standards
  - Withdraw (W) and Incomplete Grades (I & X)
  - Withdrawal date for this semester
- Student Code of Conduct
  - Academic Dishonesty/Plagiarism and Civility
- Use of Communication and Information Technology

Office of Student Support and Disability Services:
RCBC welcomes students with disabilities into the college’s educational programs. Access to accommodations and support services for students with learning and other disabilities is facilitated by staff in the Office of Student Support (OSS). To receive accommodations, a student must contact the OSS, self-identify as having a disability, provide appropriate documentation, and participate in an intake appointment. If the documentation supports the request for reasonable accommodations, the OSS will provide the student with an Accommodation Plan to give to instructors.

For additional information, please contact the Office of Student Support at 609-894-9311, ext. 1208, disabilityservices@bcc.edu, or http://www.rcbc.edu/studentsupport.
ATTENDANCE POLICY

Board Attendance Policy for Fall 2014 and beyond

“Students are required to attend all classes, clinical, laboratory, and studio sessions for the full duration of each instructional session.”

When a student exceeds a ten-percent absence rate, grade penalties for absence will be imposed, not to exceed 10% of the final grade.
(10% absence rate = 3 days for a class that meets twice per week)

Under the new policy, there are no longer excused absences. Also, even if all work is accomplished, the grade penalty for excessive absence may be imposed.

Note: Attendance will be taken during Lecture and Lab.
A student who is Late or leaves Early will be marked accordingly.
Poor Attendance will affect your grade. See pages 10, 11, and 15.

Students are responsible to complete all missed course work for any type of absence.

Students should set up a buddy system. Get phone # of at least one classmate to find out what is missed if absent, and to go over HW and study together.

1st Person’s Name:________________________ Phone # ______________

2nd Person’s Name:________________________ Phone # ______________

Absences will not be counted in those cases where alternates to classroom activities are assigned during instructor attendance at professional conferences or meetings (e.g., NJEA Convention).

ACCOMODATION FORMS

Students that want to request Accommodation Forms should contact the Office of Student Support and Disability Services. The Coordinator is Donna Kaklamanos at ext. 1803. Her E-mail is at Dkaklamanos@bcc.edu. Her Assistant is at ext. 1208.
PROFESSIONAL BEHAVIOR EXPECTATIONS

Students are expected to have a professional attitude in class as indicated by the following:

1. **Good attendance**
2. **Be on time for class and stay for the full duration.**
3. Prepared for class. ie. HW complete
4. Turn in assignments on time
5. Participate in class discussions but not talk out of turn.
6. Be an active lab group participant.
7. Have good lab work habits by:
   1. Turning off equipment.
   2. Putting parts back, and particularly, resistors in their proper partition in the resistor drawer.
   3. Cleaning up lab benches and pushing in chairs when done.
8. Be respectful and courteous to other students and the instructor. Give assistance to other lab groups if they ask for help.

UNACCEPTABLE / DISRUPTIVE BEHAVIOR

Disruptive behavior can include but is not limited to:

1. **Excessive talking in class** when the instructor or another student is talking. There should be only one person talking at a time in class. The Instructor or a student...not both.

2. Based on Jan 18, 07 Division meeting with the Academic Vice President, **ALL CELL PHONES ARE to be TURNED OFF During Class (Not Set to Vibrate)**
   If you are expecting an important call, let the instructor know ahead of time and sit by the door.

   **Excessive trips out of the classroom for cell phone conversations,**... during class, can result in a failing grade as covered in the board policy on attendance. These matters should be taken care of outside of class time.

3. **Other Inappropriate activities** include: **computer email, chat-rooms, online shopping, etc.; cell phone activities, playing games, listening to CD’s, radio, or MP3s** during Lecture or Lab.

   These items represent Prohibited Conduct as outlined in the RCBC Student Code of Conduct. Under the sanctions, the student could be **expelled from the class and receive an F grade.**
LAB GRADE

1. **Lab Double Check System:** Lab Grade Maximum is 10 Points
   a. **1st Check Off** is worth **5 points** and is given when:
      - Initial data and calculations are correct.
      - The lab must be set up for first check off so if there are any mistakes, the set up can be checked for errors.
   b. **The conclusion** is worth 2 Pts. of the 2nd Check-off, or 20% of the total lab grade. The conclusion must be typewritten using the format shown on page 15. At the end of the lab turn in your group’s conclusion to the lab instructor for evaluation & only leave lab after the instructor returns the marked-up conclusion.
   c. **2nd Check Off** is worth an additional **5 points** and is given when:
      - The lab report is complete, correct, neat, and handed in on time.

2. **Attendance:** Attendance will be taken during Lec/Lab. Students must stay for the full duration based on Board Policy, unless they complete the entire lab and have permission from the instructor to leave early. Points will be taken off Lab grade for time missed during lab.

3. **Lab Due Date:** Labs are due the next lab period for full credit.
   - Labs turned-in 1 week late will be penalized 1 point (1 letter grade).
   - Labs turned-in 2 weeks late will be penalized 2 points (2 letter grades).
   - Labs more than 3 weeks late will be penalized 3 points (3 letter grades).

   Each student is to turn in their own lab report. Not one per group.

4. **Make-up labs** There will be one day near the end of the semester when make-up labs can be done. Full credit will be given for a make-up lab provided the instructor’s signature with the date is on the lab, and if handed in one week after performing the lab. This is important because to receive credit for a make-up lab you must have this signature and date.

5. **Lab Grading:**
   Sample Questions and Calculations will be graded.
   Also, up to 2 Points will be taken off for sloppy work.
   Grading of Labs will be strict in the beginning, so put in your best effort to get a good grade.

   For a complete lab, two signatures are required and a maximum of 10 points given. If a lab is not handed-in no points will be given for that lab.

6. Enter your lab points in table below:
   1. (Skip)  2. ____  3. ____  4. ____  5. ____  6. ____  7. ____
   8. ____  Drop Lowest Score: ____ Total Points = ____

   Lab Average = Total points ÷ Number of labs assigned.
   Lab Grade Average will count 12.5% of the Electronic / Mechanical Grade.
Labs Conclusion Format

The Lab Conclusion is 20% of the Lab Grade.

Use the following format when typing your lab conclusions:

<table>
<thead>
<tr>
<th>Lab # - Lab Title</th>
<th>Name 1</th>
<th>Name 2</th>
<th>Name 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course – Section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name 3</td>
<td></td>
<td></td>
<td>(add’l names)</td>
</tr>
</tbody>
</table>

Notes relating to the lab conclusion may be handwritten during the lab period for reference when typing the final version. Use proper written English sentence structure & grammar. Discuss all topics on the conclusion page in a relevant and technical fashion. **The length of the conclusion should be between \( \frac{3}{4} \) and 1 page.** After completing the typed conclusion at the end of the Lab session, print it and turn it in to the instructor. Then, wait for instructor’s evaluation before leaving the lab.

**Document Specs. for Lab Conclusion:**

- **font size:** 14 point font
- **font type:** Arial, Courier
- **line spacing:** between 1.5 and 2 (double)
- **margins:** left = 1.0”  right = 1.0”
  top = 1.0”   bottom = 1.0”

**Note:**
Use the paragraph above as an example of the proper format.
Lab Conclusion Instructions

- Each lab group will submit one Conclusion with the names of all group members.
- Names of lab partners must be put at the top of each member’s lab.
- No group may leave early until the lab conclusion is typed, handed-in, evaluated by the lab instructor, returned to the lab group, changes made, and copies made for each lab group member.
- Any group that doesn’t get to the conclusion by the end of the lab period should hand it in at the next class session (lecture or lab). The marked-up lab conclusions will be handed back at the following class session.
- Each member of a lab group must hand-in their own lab, with lab partners names at the top, and a corrected copy of the lab conclusion attached at the end.
- One member must also attach the instructor’s marked up conclusion at the end.
- Conclusions may NOT be shared between groups.

Lab Grading

<table>
<thead>
<tr>
<th>Lab Grading</th>
<th># of points deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missed Lab time (late or left early)</td>
<td>1 – 5</td>
</tr>
<tr>
<td>Excessive consultations with lab instructor (or other lab groups).</td>
<td>1</td>
</tr>
<tr>
<td>Your name missing on top of first page of lab</td>
<td>1</td>
</tr>
<tr>
<td>Missing lab partner(s) names on top of first page of lab</td>
<td>1</td>
</tr>
<tr>
<td>Missing marked up evaluated conclusion</td>
<td>1/2</td>
</tr>
<tr>
<td>Sloppy work</td>
<td>up to 2</td>
</tr>
<tr>
<td>Calculations missing or incomplete</td>
<td>up to 2</td>
</tr>
<tr>
<td>No steps in calculations (answers only)</td>
<td>up to 2</td>
</tr>
<tr>
<td>Calculations with missing units</td>
<td>up to 1</td>
</tr>
<tr>
<td>Questions not answered or answered incorrectly</td>
<td>up to 2</td>
</tr>
<tr>
<td>Graphs/plots not done or labeled improperly</td>
<td>up to 1</td>
</tr>
<tr>
<td>No conclusion</td>
<td>2</td>
</tr>
<tr>
<td>Conclusion not typed or wrong format</td>
<td>1</td>
</tr>
<tr>
<td>Conclusion answered with incomplete sentences and/or incorrect grammar</td>
<td>up to 1</td>
</tr>
<tr>
<td>Incorrect or irrelevant statements for Questions or Conclusion</td>
<td>up to 2</td>
</tr>
</tbody>
</table>

Grading may seem strict at the beginning, so put in your best effort to get a good grade.
HOMEWORK GRADE

1. Question/Answer Session Grading: HW Grade Maximum is 10 Points

At the end of the question/answer session, HW will be collected. The HW grade is based on its state of completion, neatness, and that all steps to problem solutions are shown.

If HW is not consistently done by the HW session the instructor may give an unannounced quiz at the beginning of the period. The pop quizzes, if given, will count 5% of the final grade.

Homework Grading:

<table>
<thead>
<tr>
<th>HW Grade</th>
<th>for</th>
<th>% Complete</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 to 9 Pts</td>
<td>100 to 90</td>
<td></td>
</tr>
<tr>
<td>9 to 8 Pts</td>
<td>90 to 80</td>
<td></td>
</tr>
<tr>
<td>8 to 7 Pts</td>
<td>80 to 70</td>
<td></td>
</tr>
<tr>
<td>7 to 6 Pts</td>
<td>70 to 60</td>
<td></td>
</tr>
<tr>
<td>6 to 0 Pts</td>
<td>60 to 0</td>
<td></td>
</tr>
</tbody>
</table>

1) HW turned-in 1 week late will be penalized 1 point.
3) HW turned-in 2 weeks late will be penalized 2 points.
4) HW more than 3 weeks late will be penalized 3 points.
5) HW with no calculation steps will lose up to 50% off HW grade.
6) Sloppy HW will lose up to 40% off HW grade.

Enter your Homework Points in the table below:

1._____  2._____  3._____  4._____  
5._____  6._____  

Drop the lowest score.

Total Points =

HW Grade Average = (Total points ÷ Number of HW assignments) x 20.

HW Grade average will count 12.5% of the Final grade.
**TEST REQUIREMENTS:** Test Grade Average Counts 37.5% of the Final Grade

1. **Tests must be taken on time.**

2. All **Cell phones must be off Not Vibrate** and put in back pack during the test. You cannot use cell phone calculators for the test.

3. You **cannot leave the class during a test.** If you leave the class during the test, the test will be collected.

4. You will be allowed to take **one late test** at the end of the term.

5. **For 2 or more late tests 10% will be deducted.**

6. **No low test grades will be dropped.**

7. **One retest will be given to replace your lowest grade if below 80%.** at the end of the term. The Maximum Retest Grade is 80%.

Enter your Test grades in the table below:

1. _____ 2. _____ 3. _____ Total Test Points = _________

Test Average = Total Test Points ÷ Number of Tests

Test Average will count 37.5% of the Final grade.

OTHER FACTORS AFFECTING FINAL GRADE:

If a student has attendance, cell phone, or inappropriate computer activity problems during lecture or lab, he/she can lose as much as 5% off the final grade for minor disturbances, or an F Grade for consistent major disturbances.

**Item to improve Final grade:**

**Professional attitude** for: Outstanding Attendance, on time, class contributions, and willingness to help others.

Add up to ½ point to Final grade.
EGR 103 Written Report Grading Rubric for Team Design Project

Report Title: _________________________________________________________ Term / Year: ______

Students Names: ______________________________________________________________ Sec #: ____

Course Learning Outcomes # 1 thru 4 are partially assessed by the Design Project Written Report

Instructions: 1. Fill in the comments for each outcome.  

2. Choose the score whose value most closely describes the quality of the project.

<table>
<thead>
<tr>
<th>Outcome Score</th>
<th>9.5 ± .5</th>
<th>8.5 ± .5</th>
<th>7.5 ± .5</th>
<th>6.5 ± .5</th>
<th>6-0</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Project Written Report</td>
<td>Excellence of elements and all are present</td>
<td>Mastery of elements and 1 is missing or 1 or 2 poorly done</td>
<td>Acceptable knowledge of elements and 2 are missing or 3 or 4 are poorly done</td>
<td>Minimal knowledge of elements and 3 or more missing or 4 or more are poorly done</td>
<td>Unsatisfactory</td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td>Students should be able to develop:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a Mechanical Report, Drawings and an Electronic Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Score =</td>
<td>Average Score = Total Score / 3 =</td>
<td></td>
<td>Score in % =</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max</th>
<th>Score</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Report</td>
<td>Goal / Objective</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Sequence of Events</td>
<td>2.5</td>
</tr>
<tr>
<td>Total Score</td>
<td>Unique Features, Parts List &amp; Mech. Calc.</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Design Improvements</td>
<td>2.5</td>
</tr>
<tr>
<td>Drawings</td>
<td>Mechanical Drawing w. Dimensions</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Photo gate Block Diag. including 555 and Digital Recorder Block Diagrams</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Score</td>
<td>Photo gate Schematic and 555 Timer Schematic if applicable</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Digital Recorder Schematic</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Overall Report Organization</td>
<td>2.0</td>
</tr>
<tr>
<td>Electronic Report</td>
<td>Intro &amp; Photo gate General Operation</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Photo gate Part Function &amp; 555 Calc. if applicable</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Score</td>
<td>Digital Recorder General Operation</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Elec. Interfacing &amp; Ckt. Problems/Solutions</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>What Learned from Course &amp; Proj.</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Guideline for Written Report Organization and Content

**Mechanical Report Format** 3-4 Pages w/o Drawings, Font TNR or Arial 12, Double Space

**Heading** - **Goal / Objective of your project** – *Rewrite & expand specifically for your project.*

The goal of this project is to create an electronically controlled, mechanically moving obstacle for a remote control car that presents a challenge to the driver, but the driver should be able to get thru based on driving skill or chance. The car may or may not be damaged if a car doesn’t make it thru. *(Rewrite and expand the Goal / Objective specifically for your project.)*

**Heading** - **Sequence of Events** (Include all scenarios) could use flow chart diagram

**Heading** - **Unique Features of the Design** and **Parts List of Unique Parts**

**Heading** - **Mechanical Calculations** – Pulley or Sprocket ratios and rpm & torque Out etc.

**Heading** - **Design Problems and Improvements** that had to make to solve them

**Drawings**  Top Left - **Group Name**,  Center - **Drawing Title**,  Top Right - **Sec#/Term/Yr.**  
*(Don’t put in any hand sketch drawings)*

Generally **all drawings** should be drawn with **parts close together and printed in landscape**.

Use **14 or 16 Pt Font for Text.** **All drawings** should be **printed** out so they **fill the page**

**Report Organization**  **Put all Drawings in order below after Mech. or Electronic report headings**

**Mechanical Drawing:** Isometric drawing: Top, Front and Side View with Dimensions

**Electronic Drawings:**  Photo gate Block Diagram including 555 if applicable,

  - Photo gate Schematic,
  - 555 Timer Schematic if applicable,
  - Digital Recorder Block Diagram and
  - Digital Recorder Schematic

**Electronic Report Format** 3-4 Pages w/o Drawings, Font TNR or Arial 12, Double Space

**Heading** - **Introduction & Photo Gate general operation**

Include the 555 Timer if applicable – refer to block diag. *(See Proj. Guide Sec 10)*

**Heading** - **Photo Gate Part Function** – Reference R & C # in your schematic.

**Heading** – **555 Calculations**

**Heading** - **Digital Recorder Operation** – Start with Conventional Digital Recorder then go to ISD1760, include special characteristics and refer to block diagrams.

**Heading** – **Elec. Interfacing & Circuit problems that had to solve and how solved them**

**What learned from course and project** - at end of Mechanical Report or end of entire report

Include: Designing, Problem Solving, Teamwork, and Time Management See Proj. Guide Sec 10
EGR103 Oral Presentation Judge’s Grading Rubric for Team Design Project

Project Title: ___________________________________________________________  Term/Year: ___

Student’s Name(s): ___________________________________________________________  Sec#: ___

Course Learning Outcomes # 1, 3 & 4 are partially assessed by the Design Project Oral Presentation

Instructions:  1. Fill in the comments for each outcome.  Judge’s Name____________________________

2. Choose the score (10 to 0), which most closely describes the quality of each outcome.

<table>
<thead>
<tr>
<th>Design Project Outcome Scores (where applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>Students should be able to</td>
</tr>
<tr>
<td>make an Oral Presentation and</td>
</tr>
<tr>
<td>Written Report that shows a Mastery of:</td>
</tr>
<tr>
<td><strong>Mechanical Presentation Content</strong></td>
</tr>
<tr>
<td><strong>Electronic Presentation Content</strong></td>
</tr>
<tr>
<td><strong>Drawings for Report &amp; Presentation</strong></td>
</tr>
<tr>
<td><strong>Report Organization &amp; Content</strong></td>
</tr>
<tr>
<td><strong>Presentation - Power Point, Graphics, Speaking Style, Attire &amp; Q/A Session</strong></td>
</tr>
<tr>
<td><strong>Project Construction &amp; Demo</strong></td>
</tr>
<tr>
<td>Total Score =</td>
</tr>
</tbody>
</table>

Design Project Comments: Strengths & Weaknesses

<table>
<thead>
<tr>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Presentation Content</td>
</tr>
<tr>
<td>Electronic Presentation Content</td>
</tr>
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<td>Project Construction &amp; Demo</td>
</tr>
</tbody>
</table>
CALCULATIONS OF FINAL GRADE POINT AVERAGE

Add up 1) Test 1 Grade, 2) Test 2 Grade,
3) Test 3 Grade, 4) HW Grade Average,
5) Lab Grade Average, 6) Outside Judges Grade,
7) Project Report Grade, 8) Self Evaluation Grade.

Final Grade Point Average: Calculate by Adding Up All 8 Grades and ÷ by 8

GRADES

A. To pass the course all units must be completed.

All Three conditions must be met to receive a particular grade.

1. All Tests Taken.
2. Minimum Final Grade Point Average, and
3. Minimum number of labs completed.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Final Grade Pt. Avg</th>
<th>Tests Taken</th>
<th>Minimum Number of Labs or Dwgs. Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 to 90</td>
<td>All</td>
<td>7</td>
</tr>
<tr>
<td>B+</td>
<td>89 to 85</td>
<td>All</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>84 to 80</td>
<td>All</td>
<td>6</td>
</tr>
<tr>
<td>C+</td>
<td>79 to 75</td>
<td>All</td>
<td>5</td>
</tr>
<tr>
<td>C</td>
<td>74 to 70</td>
<td>All</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>69 to 65</td>
<td>All</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>below 65</td>
<td>1 or more</td>
<td>less than 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>not taken</td>
<td></td>
</tr>
</tbody>
</table>

B. Course Letter Grade Explanation:

For example, for a B grade you must take all tests and complete all drawings, 6 labs, and have an 80% (minimum) Final grade point average.

If you took all Tests, had an 83% Final average (qualifying for a “B” grade) but only completed 5 labs your course grade would be a “C+”.

In other words, all Four conditions must be met; Final grade point average, All tests taken and drawings completed, and a Minimum number of labs completed to receive a particular course grade.
EXPLANATION OF OTHER GRADES

1. If a D grade is received it will not satisfy the prerequisite requirement for the next course and it is not transferable to other colleges.

2. An F grade is assigned if any one of the Four conditions for a D is not met. An F can also be given for cheating, excessive absences, game playing, or academic misconduct. **Academic misconduct includes any misconduct or behavior of a student which disturbs the learning process in class.**

3. An “I” (Temporarily Incomplete) is rarely issued. An “I” grade will only be issued for a student that was unable to show up for the last week due to a documented emergency.

   The “I” grade can only be assigned upon mutual agreement between the student and instructor if everything except the last week of work has been completed, and the student fills out the “Incomplete” form. The student must complete work within 30 days of the beginning of the next term, otherwise that “I” will automatically become an F.

   **The student must fill out the “I Contract” to receive an “I” grade.**

4. **Withdraw** - If a student finds it necessary to withdraw from the course he/she must do so before the ninth week by notifying the instructor and registrar and by completing the withdrawal form.

   After the ninth week the student will receive a grade based on work in the course. Do not expect to withdraw the “last day” of the course to avoid a failing grade.

   **Check with the registration office for the last day to withdraw.**

5. An “X” or (extended incomplete) grade will be given for a final grade only if a student requests it and fills out the “extended incomplete” form. The “X” will become an F if the student does not retake the course within one year.

6. **ST** (Stopped attending) grade will be given for a student that stopped attending and as a consequence did not complete enough work to Pass. It has the same consequences (i.e. GPA) as an F and is recorded on the transcript. In addition, it can have financial implications with Financial Aid and student loans.
CALCULATORS

Students are required to own and know how to operate a calculator for HW, and bring to class for Labs and Tests.

Cell phone calculators are not allowed for tests.

Useful features to look for when shopping for a calculator:

Common Functions:

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/x , X↔Y, x² , √x, yˣ , ¹√y</td>
<td>EE for entering a number in scientific notation, +/- for changing the sign of a number or exponent, SCI, ENG changes how the display represents powers of 10 notation</td>
</tr>
<tr>
<td>Log X , 10ˣ , Ln x , eˣ</td>
<td>D↔R (Conversion between Degrees and Radians)</td>
</tr>
<tr>
<td>Sin , Arc Sin, Inv Sin or Sin⁻¹</td>
<td>Cos , Arc Cos, Inv Cos or Cos⁻¹</td>
</tr>
<tr>
<td>Tan , Arc Tan, Inv Tan or Tan⁻¹</td>
<td>π</td>
</tr>
</tbody>
</table>

Trig Functions:

A convenient feature is Rectangular to Polar coordinate conversion. R↔P button

Example of work saved by using this feature:

Rectangular to Polar: \[ a + jb \Rightarrow M = \sqrt{a^2 + b^2}; \quad \theta = \tan^{-1} \frac{b}{a} \]

Polar to Rectangular: \[ M \cos \theta + jM \sin \theta \Rightarrow a + jb \]
SUGGESTED STUDY PLAN

1. Attend the lecture, lab and the question/answer sessions and:

2. Bring to all Electronics / Mechanical Classes, Binder #1, Containing the lecture, HW, and Lab Packets.

3. Read over all your lecture notes.

4. Answer the homework questions.

5. Review the Homework, lecture notes, and labs for the test (Study a minimum of 1 Hour). If there are no HW questions on a certain part of the lecture notes, do not assume it won’t be on the test.

RATIO OF CLASS TIME TO STUDY TIME

The ratio to class time to study time is expected to be 1:2. Therefore, for the 4 credit hours of class time, 8 hours of study time are required.

A student with 12 course credits should allocate 24 hours of study time (outside of class time) for a total time allocation of 36 hours / week.

Do not expect to pass all your classes if you work full time (40 hrs/week) AND have enrolled in a full time class load of 12 or more credits.