

ENGR 102 Course Outline as of Fall 2014

CATALOG INFORMATION

Dept and Nbr: ENGR 102

Title: ROBOTICS DESIGN PROJECT

Full Title: Robotics Design Project

Last Reviewed: 4/13/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	1.00	Lecture Scheduled	1.00	17.5	Lecture Scheduled	17.50
Minimum	1.00	Lab Scheduled	0	2	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	1.00		Contact Total	17.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 35.00

Total Student Learning Hours: 52.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

Catalog Description:
Students will work in small groups to design, construct, and test a small autonomous robot using the LEGO Mindstorm Robotics Kits. Students gain exposure to mechanical and electrical engineering, as well as computer programming in a team-oriented environment.

Prerequisites/Corequisites:

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will work in small groups to design, construct, and test a small autonomous robot using the LEGO Mindstorm Robotics Kits. Students gain exposure to mechanical and electrical engineering, as well as computer programming in a team-oriented environment. (Grade or P/NP)
Prerequisites/Corequisites:
Recommended:

Limits on Enrollment:

Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:

IGETC:	Transfer Area	Effective:	Inactive:
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CSU Transfer:	Effective:	Inactive:
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UC Transfer:	Effective:	Inactive:
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CID:

Certificate/Major Applicable:

Major Applicable Course

Approval and Dates

Version:	02	Course Created/Approved:	2/25/2008
Version Created:	1/7/2014	Course Last Modified:	5/12/2020
Submitter:	Vince Bertsch	Course last full review:	4/13/2020
Version Status:	Approved (Changed Course)	Prereq Created/Approved:	4/13/2020
Version Status Date:	2/10/2014	Semester Last Taught:	Spring 2015
Version Term Effective:	Fall 2014	Term Inactive:	Fall 2020

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Demonstrate individual and team skills on a narrowly defined engineering task under time and competition pressures.
2. Design, build, program, test, and troubleshoot a LEGO Mindstorm autonomous robot.

Objectives:

Upon completion of this course, the students are expected to be able to:

1. Describe and apply appropriate team behaviors and time management skills.
2. Interpret and augment design specifications to develop detailed design goals.
3. Assemble LEGO components into functional autonomous robot.
4. Program LEGO controller modules to perform rudimentary tasks.

Topics and Scope:

- I. Overview of Team Project Skills
 - A. Team roles and behaviors
 - B. Team time management

- C. Engineering design algorithms
- D. Oral presentation skills
- II. Design Specifications
 - A. Interpretation of design specifications
 - B. Clarification and modification of design specifications
 - C. Using design specifications to generate team goals
 - D. Measurement techniques for design specification verification
- III. LEGO Robotics Components
 - A. Structural members and their assembly options
 - B. Sensors and their measuring capabilities
 - C. Motors and the corresponding torque/power characteristics
 - D. Battery pack options and their behaviors
 - E. Logic controller module (RCX and NXT)
- IV. Module Programming
 - A. Direct programming with RCX and/or NXT code
 - B. Downloading to controller module
 - C. Indirect programming with C++ and associated compiler
 - D. Inputting from light and touch sensors
 - E. Outputting to motors and speaker

Assignment:

1. Participation, orientation and teamwork exercises (2-5)
2. Self-paced assembly and programming training modules (1-2)
3. Preliminary technology demonstration
4. Project planning documents (typically detailed design goals and a tabular timeline with responsibilities)
5. Checkpoint meeting presentations and documents (typically three: concept, mechanical and software)
6. Self and team assessments (2)
7. Construction of robot
8. Robotic performance contest

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing
0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Project planning and checkpoint documents

Problem solving
20 - 40%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Technology skill demonstrations, checkpoint meeting presentations, robot construction, robotics contest

Skill Demonstrations
30 - 40%

Exams: All forms of formal testing, other than skill performance exams.

None

Exams
0 - 0%

Other: Includes any assessment tools that do not logically fit into the above categories.

Participation in class exercises and design team activities.
Completion of training modules.

Other Category
20 - 40%

Representative Textbooks and Materials:

Instructor prepared materials

OTHER REQUIRED ELEMENTS

STUDENT PREPARATION

Matric Assessment Required:	X	Exempt From Assessment
Prerequisites-generate description:	NP	No Prerequisite
Advisories-generate description:	NA	No Advisory
Prereq-provisional:	N	NO
Prereq/coreq-registration check:	N	No Prerequisite Rules Exist
Requires instructor signature:	N	Instructor's Signature Not Required

BASIC INFORMATION, HOURS/UNITS & REPEATABILITY

Method of instruction:	02	Lecture
Area department:	ENGR	Engineering and Applied Technology
Division:	73	Science, Technology, Engineering & Mathematics
Special topic course:	N	Not a Special Topic Course
Program status:	1	Major Applicable Course
Repeatability:	00	Two Repeats if Grade was D, F, NC, or NP
Repeat group id:		

SCHEDULING

Audit allowed:	N	Not Auditable
Open entry/exit:	N	Not Open Entry/Open Exit
Credit by exam:	N	Credit by examination not allowed
Budget code: Program:	0000	Unrestricted
Budget code: Activity:	0901	Engineering

OTHER CODES

Discipline:	Engineering Support OR Engineering	
Basic skills:	N	Not a Basic Skills Course
Level below transfer:	Y	Not Applicable
CVU/CVC status:	N	Not Distance Ed
Distance Ed Approved:	N	
Emergency Distance Ed Approved:	N	None
Credit for Prior Learning:	N	Agency Exam
	N	CBE
	N	Industry Credentials
	N	Portfolio
Non-credit category:	Y	Not Applicable, Credit Course
Classification:	Y	Liberal Arts and Sciences Courses
SAM classification:	E	Non-Occupational
TOP code:	0901.00	Engineering, General
Work-based learning:	N	Does Not Include Work-Based Learning
DSPS course:	N	Not a DSPS Course
In-service:	N	Not an in-Service Course