Robotics Fundamentals

TEAM - 1205 101

Course Description

The Robotics Fundamentals course is an introduction to robotics and applications for industrial robotics or autonomous machines. The technical aspects of industrial robotics are covered; principles of robotics; power supplies, movement systems; sensing, tooling, control systems and maintenance. The course includes safety, industrial applications, end effectors, and vision. It is recommended students complete TEAM 1010and TEAM 1050 prior to taking this course.

Semester(s): All

Course Student Learning Outcomes

- Demonstrate safety practices and procedures of pneumatic systems.
- Identify and classify robots and classifications of industrial robots.
- Explain and list parts of the robot and degree of freedom.
- Explain fundamentals of robot programming.
- Describe and explain power supplies and movement systems.
- Explain and identify transducers used in automated systems.
- Explain and identify key fundamentals of robotics control systems and maintenance.

College Wide Student Learning Outcomes

- Students acquire substantive knowledge in their intended major

- Students think critically

Course Prerequisites

As listed in catalog

Transfer/Certification/Licensure/Employment Information

As listed in SLTC transfer information.

Engagement Plan

Example language:

- We will respond to email within 24 to 48 hours except Saturday and Sunday. We will offer feedback on major assignments within 24 to 48 hours except Saturday and Sunday] The best way to contact us regarding course work is via the Canvas Inbox, as I will prioritize this email over other modes of communication. Other issues use Outlook.

Keys for Success (how to succeed in the course)

Regular attendance and making daily progress is critical.

Staying on track and working on a regular basis.

Ask for assistance when needed.

Complete all assignments as listed.

Course Content Advisory

PACE Plans are designed to keep you on PACE and making good progress.

Required Text or Materials

Title: As listed in course introduction module

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

Brief Description of Assignments/Exams

Grading Criteria & Assessment Definitions
Grading System: The list below is how letter grades will be defined for the course work required
and completed. Each course will have specific requirements as listed in the canvas course site.

Letter Grades Scale:
The SLTC Electronics Department has as a minimum grade requirement of: C+ (77%) as a passing grade for all courses and all course assignments and assessments.

Grades for SLTC Electronics Department are based on the categories assignment/assessments areas
below: In most courses there are all 4 categories as shown below and the letter grade will be based
upon the average of the applicable categories. There are courses that do not have 4 categories and
those exceptions are below.

4 - Categories

Formative Assessment Cognitive
Formative Assessment Performance-Based
Summative Assessment Cognitive
Summative Assessment Performance-Based

Items
Theory/Quizzes Weight
25%
Skills Based Hands-on Weight

25%
Theory/Quizzes/Exams Weight
25%
Skills Based Hands-on Weight
25%
100%

Criteria
100% of course work @ minimum grade of 77% for each assignment.
100% of course work @ minimum grade of 77% for each assignment.
100% of course work @ minimum grade of 77% for each assignment.
100% of course work @ minimum grade of 77% for each assignment.

Any 3 - Categories Courses - Where there are only a SAC or SAP - but not both. Or not a FAC and/or
FAP. Weight 33.33%
Formative Assessment Cognitive
Formative Assessment Performance-Based
Summative Assessment Cognitive or Summative
Assessment Performance- Based

Items
Theory/Quizzes
Skills Based Hands-on
Theory/Quizzes/Exams Skills Based Hands-on
100%

Criteria
100% of course work @ minimum grade of 77% for each assignment.
100% of course work @ minimum grade of 77% for each assignment.
100% of course work @ minimum grade of 77% for each assignment.

2 - Categories assessments/assignments each will carry 50% of total weight for a total of 100%.

Formative Assessment – During the Learning Cycle
• Formative assessment is a term for any type of assessment or assignment used to gather
student
feedback and improve instruction. Formative assessments occur during the learning process, often
while students are engaged in other activities. Anecdotal records, periodic quizzes or essays,
diagnostic tests and in-class or homework assignments are all types of formative assessment because
they provide information about a student's progress. Any Formative Assessment serves in most cases
as the determining tool that “says” you as a student are ready and able to “Demonstrate Proficiency” of the required course outcomes/objectives.

Therefore, any weakness or missed objectives that need addressing during the Formative cycle will
require some level of remediation before any Summative Assessments are allowed.

You are encouraged to ask for assistance with concepts that are challenging.
Summative Assessment – Demonstration of Proficiency
• Summative assessment occurs at various points in a course and may include both cognitive and
performance-based assessments.
• This is a time that you as a student should be able to complete the assignments and meet the
criteria listed for the assessment.
• Objectives must be performed to the level that would meet industry requirements.

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points

Due Date	Assignment Name	Assignment Type	Points
	Module 10 - Computer Systems and Digital Electronics - Vocabulary/Matching FAC	Assignment	100
	Module 12 - Maintaining Robotic Systems - Vocabulary/Matching FAC	Assignment	100
	Module 13 - Robots in Modern Manufacturing - Vocabulary/Matching FAC	Assignment	100
	Module 15 - Designing and Constructing a Robot - Vocabulary/Matching FAC	Assignment	100
	Module 15 - Designing and Constructing a Robot -SAP	Assignment	100
	Module 2 - Fundamentals of Robotics - Vocabulary/Matching FAC	Assignment	100

Due Date	Assignment Name	Assignment Type	Points
	Module 2 - Fundamentals of Robotics - FANUC Exporation Report FAP A	Assignment	100
	Module 4 - Robot Programming - Vocabulary/Matching FAC	Assignment	100
	Module 5 - Industrial Applications - Vocabulary/Matching FAC	Assignment	100
	Module 7 - Fluid Power Systems - Vocabulary/Matching FAC	Assignment	100
	Module 8 - Sensors - Vocabulary/Matching FAC	Assignment	100
	Module1 - Introduction to Robotics - Vocabulary/Matching FAC	Assignment	100
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0

Due Date	Assignment Name	Assignment Type	Points
	Module 1 - Introduction to Robotics - FAC	Quiz	20
	Module 10 - Computer Systems and Digital Electronics - FAC	Quiz	20
	Module 11 - Interfacing and Vision Systems - FAC	Quiz	10
	Module 11 - Interfacing and Vision Systems - Vocabulary/Matching FAC	Assignment	100
	Module 12 - Maintaining Robotic Systems - FAC	Quiz	10
	Module 13 - Robots in Modern Manufacturing - FAC	Quiz	20
	Module 14 - Robotic Applications and Innovations - Vocabulary/Matching FAC	Assignment	100
	Module 14 - Robotic Applications and Innovations - FAC	Quiz	10

Due Date	Assignment Name	Assignment Type	Points
	Module 15 - Designing and Constructing a Robot - FAC	Quiz	20
	Module 2 - Fundamentals of Robotics - FAC	Quiz	25
	Module 3 - Safety - FAC	Quiz	20
	Module 3 - Safety - Vocabulary/Matching FAC	Assignment	100
	Module 4 - Robot Programming - FAC	Quiz	25
	Module 4 - Robot Programming - Programming Report FAP B	Assignment	100
	Module 5 - Industrial Applications - FAC	Quiz	25
	Module 6 - Tools and Supplies - FAC	Quiz	30
	Module 6 - Electromechanical Systems - Vocabulary/Matching FAC	Assignment	100

Due Date	Assignment Name	Assignment Type	Points
	Module 6: - Electromechanical Systems - Performance Activities - FAP 1 - Servo Motors	Assignment	100
	Module 6: Electromechanical System - FAP 2 - Stepper Motors	Assignment	100
	Module 7 - Fluid Power Systems - FAC	Quiz	30
	Module 7 - Hydraluics FAP - 4	Assignment	100
	Module 7 - Pneumatics – FAP 3	Assignment	100
	Module 8 - Sensors - FAC	Quiz	30
	Module 8 - Sensors - FAP 5	Assignment	100
	Module 9 - End Effectors - Vocabulary/Matching FAC	Assignment	100
	Module 9 - End Effectors - FAC	Quiz	20
	Module 9 - End Effectors - FANUC Explore Report - FAP C	Assignment	100

Due Date	Assignment Name	Assignment Type	Points
	Read Text Chapert 4 - Robot Programming	Assignment	
	Read Text Chapter 14 - Robotic Applications and Innovations	Assignment	
	Read Text Chapter 13 - Robots in Modern Manufacturing	Assignment	
	Read Text Chapter 11 - Interfacing and Vision Systems	Assignment	
	Read Text Chapter 12 - Maintaining Robotic Systems	Assignment	
	Read Text Chapter 15 - Designing and Constructing a Robot	Assignment	
	Read Text Chapter 6 - Electromechanical Systems	Assignment	
	Read Text Chapter 1 - Introduction to Robotics:	Assignment	
	Read Text Chapter 10 - Computer Systems and Digital Electronics	Assignment	
	Read Text Chapter 2 - Fundamentals of Robotics	Assignment	

Due Date	Assignment Name	Assignment Type	Points
	Read Text Chapter 3 - Safety	Assignment	
	Read Text Chapter 5 - Industrial Applications	Assignment	
	Read Text Chapter 7 - Fluid Power Systems	Assignment	
	Read Text Chapter 8 - Sensors	Assignment	
	Read Text Chapter 9 - End Effectors	Assignment	
	SureServo Control System -FAP 1	Assignment	100
	Unit 1: Principles of Robotics - SAC	Quiz	35
	Unit 2: Power Supplies and Movement Systems - SAC	Quiz	40
	Unit 3 Sensing and End-of-Arm Tooling - SAC	Quiz	25
	Unit 4 Control Systems and Maintenance - SAC	Quiz	44

Grading Scale

Grade Grade Range

A	92-100%
B	77-91%
F	0 to 76%

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

For more information, navigate to the Institutional Policies tab on the Institutional Syllabus page.

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, visit the Institutional Syllabus page under the Tutoring and Learning Support tab. We encourage you to take advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the

challenges of college life. To learn more about the resources available to you and how to access them, visit the Institutional Syllabus page under the Advising and Counseling Support Services tab. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar

Additional Policies

As listed on SLTC/SLCC web sites as it applies to SLTC students.

Course Work

All course work is to be submitted by mid-night of the last day of the semester.

Any courses not completed within a semester will require the student to begin a fresh, with no credit for previous course work.

The exception to the above is for students that qualify for an "I" incomplete.

All NIDA and Amatrol and similar cloud based work must been completed during the registered semester and all submissions are required to have that respective semester date stamp.

Conditional Procedures. The student in any respective course.

1. If they have started but did not complete the course - due to non-attendance or lack of work. Grade earned at that point should be entered. B,C,D, E. etc.

2. They registered - but did not start or complete any work - after 10 days (including weekends), please use non-attendance drop