

COURSE SYLLABUS

RBTC 1305 (3:2:3)

Robotic Fundamentals

Industrial Manufacturing and Emerging Technologies

Industrial Technology Department

Technical Education Division

Levelland, Reese and Plainview Campus

SOUTH PLAINS COLLEGE

SPRING 2022

COURSE SYLLABUS

COURSE TITLE: RBTC1305 Robotic Fundamentals

INSTRUCTOR: Raymund Elizondo
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OFFICE LOCATION: ET Building, Reese Center, and Plainview Room # IM103, IM104, RC215C, PTB112

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OFFICE HOURS: By appointment

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENTS LIFE

I GENERAL COURSE INFORMATION:

- A. **Course Description:** An introduction to flexible automation. Topics include installation, repair, maintenance, and development of flexible robotic manufacturing systems.
- B. **Course Learning Outcomes:** Describe the history of robotics and its impact on production and the labor force; define the term "robot" and describe general characteristics; explain the physics of robot motion and use different teaching pendants; and describe the characteristics of different types of robot control systems, applications of robots, and end-of-arm tooling.
- C. **Course Competencies:** Students must demonstrate the ability to master the concepts and techniques covered in the classroom and lab. Each student must attain a minimum level of 70% as an average on written tests, both daily and final, and on assigned lab projects.
- D. **Tutoring:** Students who do not pass their first exam will be required to attend three hours of tutoring each week until they pass their exam. This is a course requirement and will be reflected in the course grade.
- E. **Academic Integrity:** It is the aim of Industrial Manufacturing and Emerging Technologies faculty of South Plains College to foster a spirit of complete honesty and a high standard of integrity. The attempt of any student to present as his or her own work, which he or she has not honestly performed, is regarded by the faculty and administration as a most serious offence and renders the offender liable to serious consequences, possibly suspension. Students should refer to the SPC General Catalog policy regarding consequences for cheating and plagiarism (see "Academic Integrity" as well as "Student Conduct" sections in the college catalog). At times, working with other students is encouraged for some assignments and meets SCANS competencies C-9 through C-14. If you have a question as to whether you may work with other students on any assignment, ASK YOUR INSTRUCTOR.
- F. **SCANS and Foundation Skills:** The appropriate competencies and foundations skills (SCANS) have been integrated into the IMET program. The following competencies and foundation skills have been specifically integrated into the Course. C-1, C-3 through C-8, C-17, C19, F-1 through F-3, F-5, F-6, F-11, F-16, and F-17.

II SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS:

- A. **Textbook and other materials:** Larry T. Ross, Stephen W. Fardo, James W. Masterson, Robert L. Towers; Robotics Theory and Industrial Applications, Second Edition, The Goodheart-Willcox Company Inc. Publishers, ISBN 978-1-60525-32-1-3
Arduino Uno Microprocessor kit: Available at the SPC Bookstore SKU#: 76401521100
- B. **Tools:** TI-30Xa Scientific Calculator, ANSI approved Safety Glasses, Pocket knife (Lock Blade) Or Multi-Tool, Digital Multi-meter, USB Jump-drive (Memory Stick), Earphones with standard audio jack for listening to computer audio files with, Ear Plugs or some type of hearing protection, and a class G

Hard hat and a Windows based laptop or desktop computer with internet access for online assignments and meetings.

- C. *Consistent with the latest CDC recommendations, we have revised our guidance for students, faculty, and staff who have a known exposure or have tested positive. Anyone with a known exposure should wear a mask for 10 days and should seek a COVID-19 test on day five after exposure. If you test positive or develop symptoms, you should immediately self-isolate and seek a COVID-19 test. Please immediately notify your instructor, supervisor, and DeEtte Edens, Associate Director of Health and Wellness, any time you test positive for COVID-19. Anyone who tests positive is required to self-isolate for five days. Following the five-day isolation period, if you are asymptomatic or your symptoms are resolving, you may return to work or class but should wear a mask for five additional days. If you are still symptomatic, please contact DeEtte Edens at dedens@southplainscollege.edu or 806-716-2376 prior to your return date.***

D. South Plains College Attendance Policy

Students are expected to attend all classes in order to be successful in a course. The student may be administratively withdrawn from the course when absences become excessive as defined in the course syllabus.

When an unavoidable reason for class absence arises, such as illness, an official trip authorized by the college or an official activity, the instructor may permit the student to make up work missed. It is the student's responsibility to complete work missed within a reasonable period of time as determined by the instructor. Students are officially enrolled in all courses for which they pay tuition and fees at the time of registration. Should a student, for any reason, delay in reporting to a class after official enrollment, absences will be attributed to the student from the first class meeting.

Students who enroll in a course but have "Never Attended" by the official census date, as reported by the faculty member, will be administratively dropped by the Office of Admissions and Records. A student who does not meet the attendance requirements of a class as stated in the course syllabus and does not officially withdraw from that course by the official census date of the semester, may be administratively withdrawn from that course and receive a grade of "X" or "F" as determined by the instructor. Instructors are responsible for clearly stating their administrative drop policy in the course syllabus, and it is the student's responsibility to be aware of that policy.

It is the student's responsibility to verify administrative drops for excessive absences through MySPC using his or her student online account. If it is determined that a student is awarded financial aid for a class or classes in which the student never attended or participated, the financial aid award will be adjusted in accordance with the classes in which the student did attend/participate and the student will owe any balance resulting from the adjustment.

Absence for Military Service

In accordance with Texas Education Code Section 51.9111, a student is excused from attending classes or engaging in other required activities, including exams, if he or she is called to active military service of a reasonably brief duration. The maximum time for which the student may be excused has been defined by the Texas Higher Education Coordinating Board as "no more than 25 percent of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is currently enrolled at the beginning of the period of

active military service.” The student will be allowed a reasonable time after the absence to complete assignments and take exams.

Religious Holy Days

In accordance with Texas Education Code Section 51.911, South Plains College will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within seven (7) calendar days after the absence. Students are required to file a written notification of absence with each instructor within the first fifteen (15) days of the semester in which the absence will occur. Forms for this purpose are available in the Dean of Students Office along with instructions and procedures. “Religious holy days” means a holy day observed by a religion whose place of worship is exempt from property taxation under Texas Tax Code Section 11.20.

Pregnancy

In accordance with Title IX of the Education Amendments of 1972, in the event of pregnancy, termination of pregnancy or recovery from any of these conditions a student’s absences shall be excused, as deemed necessary by the student’s physician (Title IX.) The student should contact the SPC Title IX coordinator for further assistance.

- E. The following attendance guidelines have been established for the IMET program:
1. **Absent** from class is defined as “not present and ready to participate during scheduled lecture or lab times.”
 2. **Tardy** is defined as "not present at the designated starting time of the lecture or lab.” **Three tardies will equal one absence and will be treated the same as any absence.**
 3. When a student accumulates **six** absences minimum course objectives cannot be met. At the discretion of the instructor, the student may be withdrawn from the course.
- F. **Assignment policy:** All required work must be turned in on time in order that the student may benefit from the corrections and study for future examinations. Any work that is handed in post the due date or tests missed will be accepted only at the discretion of the Instructor, Points will be taken from all late assignments or test accepted by the Instructor.
- G. **Grading Policy:** Daily tests average will equal 33.3% of final semester grade lab grade will equal 33.3% of final semester grade and final test grade will equal 33.3% of final semester grade. Written and oral assignments will be averaged in with daily test average and lab grade will consist of lab projects. The lab grade will also include an end of semester Instructor assessment that will be used to adjust the lab grade up or down by up to 20%. This is used to account for class participation, safety violations, end of class clean up as well as other criteria deemed important by the instructor such as overall attitude and demeanor.
- H. **Special Requirements:** Students in the Industrial Manufacturing and Emerging Technologies program will be required to follow safety procedures while in the classroom and the lab. Chemical hazards and appropriate SDS safety practices will be stressed as part of the safety program.
- I. **Cell phones**
No cell phones or other electronic devices are allowed in the classroom or during lectures.
Cell phones may be used during break or during labs.
- J. **Class Dress Code**
No open toed shoes, sandals or flip-flop styled shoes.
No baggy, saggy or drooping clothes. This includes wearing pants pulled down in a “Low Slung Style”.
For safety considerations standard shop acceptable attire is required.
If you have any doubts about what is acceptable see the instructor for clarification.
- K. **Tobacco Use**
No tobacco use of any kind is permitted inside the buildings.
This includes smokeless tobacco.
No spitting in the trashcans

No spitting in the urinals or toilets
No spitting on the floor (Including inside the lab/Shop areas)
No use of cups or bottles as spittoons.

III.

COURSE OUTLINE:

1. Programming
2. Applications
3. Electromechanical systems
4. Sensors
5. End Effectors
6. CNC
7. Maintenance
8. Teleoperators

SPC Standard Disability Statement

Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

Non-Discrimination Statement

South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College -1401 College Avenue, Box 5, Levelland, TX 79336, 806-894-9611

Diversity Statement

In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Campus Concealed Carry

South Plains College permits the lawful carry of concealed handguns in accordance with Texas state law, and Texas Senate Bill 11. Individuals possessing a valid License to Carry permit, or the formerly issued Concealed Handgun License, may carry a concealed handgun at all campus locations except for the following.

- **Natatorium**

For a complete list of campus carry exclusions zones by event, please visit <http://www.southplainscollege.edu/campuscarry.php>

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to the SPC policy at:
(http://www.southplainscollege.edu/human_resources/policy_procedure/hhc.php)

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

SCANS COMPETENCIES

RESOURCES: Identifies, organizes, plans and allocates resources.

- C-1 **TIME**—Selects goal—relevant activities, ranks them, allocates time, and prepares and follows schedules.
- C-2 **MONEY**—Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.
- C-3 **MATERIALS & FACILITIES**—Acquires, stores, allocates, and uses materials or space efficiently.
- C-4 **HUMAN RESOURCES**—Assesses skills and distributes work accordingly, evaluates performances and provides feedback.

INFORMATION – Acquires and Uses Information

- C-5 Acquires and evaluates information.
- C-6 Organizes and maintains information.
- C-7 Interprets and communicates information.
- C-8 Uses computers to process information.

INTERPERSONAL – Works With Others

- C-9 Participates as members of a team and contributes to group effort.
- C-10 Teaches others new skills.
- C-11 Serves clients/customers—works to satisfy customer’s expectations.
- C-12 Exercises leadership—communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies.
- C-13 Negotiates-Works toward agreements involving exchanges of resources resolves divergent interests.
- C-14 Works with Diversity-Works well with men and women from diverse backgrounds.

SYSTEM – Understands Complex Interrelationships

- C-15 Understands Systems—Knows how social, organizational, and technological systems work and operates effectively with them.

- C-16 Monitors and corrects Performance-Distinguishes trends, predicts impacts on system operations, diagnoses systems' performance and corrects malfunctions.
- C-17 Improves or Designs Systems-Suggests modifications to existing systems and develops new alternative systems to improve performance.
TECHNOLOGY – Works with a variety of technologies
- C-18 Selects Technology—Chooses procedures, tools, or equipment including computers and related technologies.
- C-19 Applies Technology to Task-Understands overall intent and proper procedures for setup and operation of equipment.
- C-20 Maintains and Troubleshoots Equipment-Prevents, identifies, or solves problems with equipment, including computer and other technologies.

FOUNDATION SKILLS

- BASIC SKILLS—Reads, writes, performs arithmetic and mathematical operations, listens and speaks**
- F-1 Reading—locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.
- F-2 Writing-Communicates thoughts, ideas, information and messages in writing, and creates documents such as letters, directions, manuals, reports, graphs, and flowcharts.
- F-3 Arithmetic—Performs basic computations; uses basic numerical concepts such as whole numbers, etc.
- F-4 Mathematics—Approaches practical problems by choosing appropriately from a variety of mathematical techniques.
- F-5 Listening—Receives, attends to, interprets, and responds to verbal messages and other cues.
- F-6 Speaking—Organizes ideas and communicates orally.

- THINKING SKILLS—Thinks creatively, makes decisions, solves problems, visualizes, and knows how to learn and reason**
- F-7 Creative Thinking—Generates new ideas.
- F-8 Decision-Making—specifies goals and constraints, generates alternatives, considers risk, and evaluates and chooses best alternative.
- F-9 Problem Solving—Recognizes problems and devises and implements plan of action.
- F-10 Seeing Things in the Mind's Eye—Organizes and processes symbols, pictures, graphs, objects, and other information.
- F-11 Knowing How to Learn—Uses efficient learning techniques to acquire and apply new knowledge and skills.
- F-12 Reasoning—Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

PERSONAL QUALITIES—Displays responsibility, self-esteem, sociability, self-management, integrity and honesty

- F-13 Responsibility—Exerts a high level of effort and preservers towards goal attainment.
- F-14 Self-Esteem—Believes in own self-worth and maintains a positive view of self.
- F-15 Sociability—Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.
- F-16 Self-Management—Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.
- F-17 Integrity/Honesty—Chooses ethical courses of action