

# **Brazosport College**

## **Syllabus for INTC 1315 – Final Control Elements**

**Instructor:**  
**Office Phone:**  
**Alt. Phone:**

**Office:**  
**Email:**

### **I. COURSE DESCRIPTION:**

#### **INTC 1315 - Final Control Elements CIP 1504040011**

Various designs of final control elements including disassembly, assembly, calibration troubleshooting, and required documentation. Basic techniques for proper valve sizing.

**Credit Hours:** 3 (2 lecture, 2 lab)

**A. Prerequisite:** Grade of “C” or better in INTC 1401.

**Required skill level:** College level reading and writing. Math: College-level with corequisite (placement code 3).

## **II. COURSE OBJECTIVES**

For common control valves student will be able to perform the following:

- Disassemble
- Assemble
- Calibrate
- Troubleshoot
- Provide documentation

Define terms related to control valves and their accessories

Describe how the control valve and their accessories operate

## **III. TOPICS DISCUSSED**

Sliding-stem Control Valve Terminology

Rotary-Shaft Control Valve Terminology

Valve Functions and Characteristics Terminology

Control Valve Performance

Actuator-Positioner Design

Valve Type and Characterization

Valve Sizing

Globe Valves

Single-Port Valve Bodies

Balanced-Plug Cage-Style Valve Bodies

Port-Guided Single-Port Valve Bodies

Double-Ported Valve Bodies

Three-Way Valve Bodies

Rotary Valves

Butterfly Valve Bodies

V-Notch Ball Control Valve Bodies

Eccentric-Disk Control Valve Bodies

Eccentric-Plug Control Valve Bodies

Valve Body Bonnets

Extension Bonnets

Bellows Seal Bonnets

Control Valve Packing

PTFE V-Ring

Laminated and Filament Graphite

Characterization of Cage-Guided Valve Bodies

Characterized Valve Plugs

Restricted-Capacity Control Valve Trim

Actuators

Diaphragm Actuators

Piston Actuators

- Manual Actuators
- Rack and Pinion Actuators
- Electric Actuators
- Control Valve Accessories
- Positioners Alignment and Calibration
  - Limit Switches
  - Solenoid Valve Manifold
  - Supply Pressure Regulator
  - Pneumatic Lock-Up Systems
  - Fail-Safe Systems for Poston Actuators
  - Electro-Pneumatic Valve Positioners
- Control Valve Selection
- Designations for the High Nickel Alloys
- Control Valve Seat Leakage Classifications
- Typical Valve Trim Material Temperature Limits
- Control Valve Flow Characteristics
  - Flow Characteristics
  - Selection of Flow Characteristics
- Non-Destructive Test Procedures
  - Magnetic Particle (Surface) Examination
  - Liquid Penetrant (Surface) Examination
  - Radiographic (Volumetric) Examination
- Cavitation and Flashing
- Control Valve for Nuclear Service in the USA
- Installation and Maintenance
- Actuator Diaphragm
- Stem Packing
- Grinding Metal Seats
- Bench Set
- Hazardous Location Classification
- Temperature Code

#### IV. STUDENT LEARNING OUTCOMES

OUTCOMES	METHOD OF ASSESSMENT
Adjust control Valve for proper operation	Test Questions & Lab Exercises
Align & Calibrate Positioners	Test Questions & Laboratory Exercises
Indicate the components used in control valves.	Associate parts list with cross sectional drawing.
Indicate the difference between Direct & Reverse Action on a Positioner.	Test Questions & Lab.
Sketch sequenced split range operation.	Test Questions & Lab.

## **V. TEXTBOOK OR COURSE MATERIAL INFORMATION**

### **A. Textbook**

1. No textbook, materials provided by instructor
2. Calculator TI-30XIIS (required)
3. Visorgogs Safety Glasses (required)

Required course materials are available at the Brazosport College bookstore, on campus or online at <http://brazosport.edu/bookstore/home.html>. A student of this institution is not under any obligation to purchase a textbook from the college bookstore. The same textbook is/may also be available from an independent retailer, including an online retailer.

**For Distance Education Courses include the following:** Contact the Brazosport College Bookstore with a credit card for course materials. Phone: 979-230-3651. Fax: 979-230-3653. Email: [bookstore@brazosport.edu](mailto:bookstore@brazosport.edu). Website: <http://brazosport.edu/bookstore/home.html>.

### **Important Semester Dates:**

Last Day to Withdraw from Classes– Check BC Academic Calendar at <http://catalog.brazosport.edu/index.php>

### **Office Hours:**

For fulltime faculty, office hours may change from semester to semester. Current faculty office hours are included on the syllabus, see link: <https://brazosport.edu/faculty-and-staff/resources/course-syllabi-instructor-information/>

For an adjunct faculty, no office hours are required, and they are not assigned an office. To set up an appointment with an adjunct, contact the instructor as per the email address on the syllabus, see link: <https://brazosport.edu/faculty-and-staff/resources/course-syllabi-instructor-information/>

## **VI. STUDENTS WITH DISABILITIES**

Brazosport College is committed to providing equal education opportunities to every student. BC offers services for individuals with special needs and capabilities including counseling, tutoring, equipment, and software to assist students with special needs. For student to receive any accommodation, documentation must be completed in the Office of Disability Services. Please contact Phil Robertson, Special Populations Counselor at 979-230-3236 for further information.

## **VII. TITLE IX STATEMENT**

Brazosport College faculty and staff are committed to supporting students and upholding the College District's non-discrimination policy. Under Title IX and Brazosport College's policy FFDA (Local), discrimination based on sex, gender, sexual orientation, gender identity, and gender expression is prohibited. If you experience an incident of discrimination, we encourage you to report it. While you may talk to a faculty or staff member at BC, please understand that they are "Responsible Employees" and must report what you tell them to college officials. You can also contact the Title IX Coordinators directly by using the contact information below. Additional information is found on the Sexual Misconduct webpage at [www.brazosport.edu/sexualmisconduct](http://www.brazosport.edu/sexualmisconduct).

Alex Crouse, Director of Student Life and Title IX Coordinator  
979-230-3355; [alex.crouse@brazosport.edu](mailto:alex.crouse@brazosport.edu)

Mareille Rolon, HR Coordinator and Deputy Title IX Coordinator  
979-230-3303; [mareille.rolon@brazosport.edu](mailto:mareille.rolon@brazosport.edu)

## **VIII. ACADEMIC HONESTY**

Brazosport College assumes that students eligible to perform on the college level are familiar with the ordinary rules governing proper conduct including academic honesty. The principle of academic honesty is that all work presented by you is yours alone. Academic dishonesty including, but not limited to, cheating, plagiarism, and collusion shall be treated appropriately.

Academic dishonesty violates both the policies of this course and the Student Code of Conduct. In this class, any occurrence of academic dishonesty will be referred to the Dean of Student Services for prompt adjudication, and may, at a minimum, result in F, in this course. Sanctions may be imposed beyond your grade in this course by the Dean of Student Services. Please refer to the Brazosport College Student Guide for more information. This is available online at <http://brazosport.edu/students/for-students/student-services/>

## **IX. ATTENDANCE AND WITHDRAWAL POLICIES**

Class attendance contributes to your final grade, but you must attend class to successfully complete the course. If you are unable to complete this course, you must complete and submit a withdrawal form with the registrar's office. If the student decides to drop out of the class, it is the responsibility of the student to initiate a withdrawal before the withdrawal deadline in order to get a "W" on their transcript. If this is not done the student will receive a grade based on test grades and class grades earned during their attendance and absence (i.e., zeros on all missed materials, exams, skills tests, and final exam).

## **X. COURSE REQUIREMENTS AND GRADING POLICY TESTING MAKE-UP POLICY**

### **A. Grading**

Attendance, lecture and lab participation	20%
Exams	40%
Final	40%

Grades are assigned as follows:

Grade	Final Average
A	90-100
B	80-89
C	70-79
D	60-69
F	Below 60

## **XI. STUDENT CONDUCT STATEMENT**

Students are expected to be aware of and follow the Brazosport College Student Code of Conduct. Students have violated the Code if they “fail to comply with any lawful directions, verbal or written, of any official at BC.” Lawful directions include precautions and requirements taken to prevent the spread of COVID-19 at Brazosport College. Students who do not follow safety requirements, including the wearing of a mask, may be removed from class by their instructor and referred to the Dean of Student Services.

## **XII. CAMPUS CLOSURE STATEMENT**

Brazosport College is committed to the health and safety of all students, staff, and faculty and adheres to all federal and state guidelines. The College intends to stay open for the duration of the semester and provide access to classes and support services on campus in the safest way possible. The College will also comply with lawful orders given by applicable authorities, including the Governor of Texas, up to and including campus closure. It is possible that on campus activities may be moved online and/or postpone if such orders are given.

## **XIII. STUDENT RESPONSIBILITIES**

Students are expected to fully participate in this course. The following criteria are intended to assist you in being successful in this course:

1. Understand the syllabus requirements
2. Use appropriate time management skills
3. Communicate with the instructor
4. Complete course work on time, and
5. Utilize online components (such as Desire2Learn) as required.

## **XIV. OTHER STUDENT SERVICES INFORMATION**

Information about the Library is available at <http://brazosport.edu/students/for-students/places-services/library/about-the-library/> or by calling 979-230-3310.

For assistance with online courses, an open computer lab, online and make-up testing, audio/visual services, and study skills, visit Learning Services next to the Library, call 979-230-3253, or visit <http://brazosport.edu/students/for-students/places-services/learning-services/>

For drop-in math tutoring, the writing center, supplemental instruction and other tutoring including e-tutoring, visit the Student Success Center, call 979-230-3527, or visit <http://brazosport.edu/students/for-students/student-success-center/>

To contact the Physical Sciences and Process Technology Department call 979-230-3618.

The Student Services provides assistance in the following:

Counseling and Advising	979-230-3040
Financial Aid	979-230-3294
Student Life	979-230-3355

To reach the Information Technology Department for computer, email, or other technical assistance call the Helpdesk at 979-230-3266.



Get the information you need – when you need it. Click <http://geni.us/BRAZO> to install **BC Connect** on your mobile device to receive reminders, explore careers, map your educational plan, be in the know about events, find out about scholarships, achieve your goals and much more.