



ACADEMIC CHALLENGE

2023 Academic Challenge Coaches Guide

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Table of Contents

The Academic Challenge	3
IMPORTANT 2021 COMPETITION CHANGES.	4
Getting Started	5
Preparing for the Competition	6
Calculator & Testing Rules	7
Calendar for 2019-2020	8
Participation Categories	9
Advancement	10
Automatic Qualifying Scores for State Finals Competition . .	11
Scoring	12
Awards	14
Competition Day Schedules	15
General Information	16
Frequently Asked Questions	17

The Academic Challenge

Academic Challenge is a test-based competition hosted by the Physics Department and Engineering Program at Eastern Illinois University. Offered to high school students, subjects tested are biology, chemistry, computer science, engineering graphics, English, mathematics and physics. More than 40 community colleges and universities in Illinois and Missouri provide sites for the tests. The tests are designed to present a challenge to the brightest high school students, and are presented in multiple-choice format. Students have 40 minutes to complete tests that range in length from 30 questions (computer science & math) to 80 questions (English).

The test material is drawn from high school senior and college freshman curricula to present a bridge between secondary and higher education. Tests are written by teams of professional engineers and faculty members at colleges and universities all across the United States. Each team produces sets of tests that increase in level of difficulty in a progression from regional, to sectional, to state finals.

This Coach's Guide is for the use of the Academic Challenge coaches. Additional information concerning the Academic Challenge program is available on the Academic Challenge website at

https://castle.eiu.edu/academic_challenge/

Guiding Philosophy of the Academic Challenge

The goal of Academic Challenge is to acquaint high school students with the course content and the level of competition that they will experience upon entering a science or engineering curriculum at the college or university level.

2023 Competition Dates

Regional Testing Window: February 1-15, 2023

Sectional Testing Window: March 1-15, 2023

State Testing Window: April 14-17, 2023

IMPORTANT 2023 COMPETITION CHANGES

1. All competitions will be held at in-person competition events, unless circumstances require that the competition is switched to a remote competition.
2. Regional and Sectional competition groupings remain the same as last year, except those schools that were reassigned based on scheduling accommodations. Those schools will be moved back to their normal geographically based regional and sectional.
3. All award medals, trophies, and ribbons will be shipped to the in-person competition hosts. All awards will be distributed by those hosts.
4. Many hosts are space limited. It is at the discretion of the host whether to allow JV participants. Please verify with the regional or sectional host whether or not JV participants will be accepted on-site.
4. Teams and students that advance to succeeding competitions will be eligible to earn awards at the succeeding competitions.
8. The cost of holding the competitions is in hiring authoring teams and purchasing awards. The awards and shipping fees have increased in price and we believe the authors and reviewers should receive an increase in compensation. However, the varsity team and at-large fees will remain \$20 per student and the JV fees will remain \$6 per student. We will find another source of funding to cover any shortage.
9. All schools that have participated in the 2022 competition are preregistered. Emails have been sent to last year's coach for your school with initial log in information. If your school did not participate in the 2022 competition, you are a new coach for your school, or have not received an initial password by October 15, 2022, please send an email to Douglas Brandt at debrandt@eiu.edu to request your school be registered for the competition, that you are the new coach, or you have not received a password.

Getting Started

Forming your team

Determining who should participate on your team is entirely up to you as the coach. Some coaches have try-outs, some ask for referrals from Science and Math teachers, and some schools might be smaller and have less involvement so they may use whoever expresses interest in competing.

Registering your team

Once you have your team formed or at least an idea of how many students will be competing, you can complete your rosters. For more information about participation details, go to the section titled “Participation Categories” on page 8.

Academic Challenge Website

The academic challenge website is at https://castle.eiu.edu/academic_challenge. Some information such as this guide and the schedule is available publicly on that home page. If you are registered as a coach, you may login and have access to your team rosters and the exam archive. In addition, students may access the exam archive from the home page using the password sent to you. After your events, you will also be able to access your participants’ scores and some statistical data about the results.

This year, all schools that have participated in the 2022 competition are preregistered. Emails have been sent to last year’s coach for your school with initial log in information. If your school did not participate in the 2022 competition or you are a new coach for your school, please send an email to Douglas Brandt at debrandt@eiu.edu to request your school be registered for the competition or that you are the new coach.

Preparing for the Competition

Below are some important details to prepare you and your team for the Academic Challenge.

Exam Archive

The exam archive contains all academic challenge exams, answer keys, and solutions. Access is open from the link on the Academic Challenge website home page.

The only purpose of these tests are for practicing for Academic Challenge. They may not be distributed outside of your academic challenge team for any other use. Please inform your students of this policy. UIUC holds the copyright on exams up through 2018 and we use them for the stated purpose with their permission. EIU holds the copyright on exams published for the 2019 and later competitions.

Topic Distributions

Topic distributions for the exams will be published on the website to help students prepare for the exams. When they become available from the exam authors, they will be found by clicking on the Exam Topics link under the Coaches dropdown menu on the navigation bar. As the exam authors got a late start this year, those documents may not be available until mid-December.

Calculator & Testing Rules

Calculator usage at all levels of the Academic Challenge competition will follow the guidelines used in the ACT, SAT, and PARCC. As in past years, calculators are allowed on the math, physics, and chemistry tests only.

General calculator rules:

- Examinees must bring their own calculators and may not share calculators.
- Only one calculator per student is allowed.
- Each competitor is responsible for his/her own calculator.
- Testing site staff will not have extra batteries or calculators.
- An acceptable calculator includes any four-function, scientific, or graphing calculator, as long as it doesn't have any of the prohibited features (see **prohibited** list below).

The following calculators and types of calculators are prohibited:

- Calculators with built-in computer algebra systems. Calculators in this category include:
 - ◆ Texas Instruments: All model numbers that begin with TI-89 or TI-92, and the TI-Nspire CAS (the non-CAS TI-Nspire is permitted)
 - ◆ Hewlett-Packard: HP 48GII and all model numbers that begin with HP 40G, HP 49G, and HP 50G
 - ◆ Casio: Algebra fx 2.0, ClassPad 300 and ClassPod 330, and all model numbers that begin with CFX-9970G
- Handheld, tablet, or laptop computers, including PDAs
- Electronic writing pads or pen-input devices (Sharp EL 9600 is permitted)
- Calculators built into cell phones or other wireless communication devices
- Calculators with a typewriter keypad (QWERTY format)
- Calculators with paper tape and/or that make noise
- Calculators that can communicate wirelessly with other calculators
- Calculators that have power cords

Competitors will be dismissed from the test and their answer sheets not scored if they are found:

- using unauthorized calculators;
- using the calculator's memory to store any test materials;
- using any device to share information at any time during the tests or during break (All electronic devices, including cellular phones and pagers, must be turned off from the time the competitor is admitted to test until dismissed after testing concludes.);
- removing any part of a test book or any notes relating to the test from the test room;
- creating a disturbance or allowing an alarm, pager, or phone to sound in the testing room.

Calendar for 2022-2023

- October 1 Registration opens on website: https://castle.eiu.edu/academic_challenge/
- December 1 Deadline for competing schools and home-schooled individuals to register
- January 1 Registration fees due in Academic Challenge office.
- February 1-15 Regional competition window
- February 25 Regional tests, answer keys, and solution sets available on website
- March 1-15 Sectional competition window
- March 25 Sectional tests, answer keys, and solution sets available on website.
- April 14-17 State Finals
- May 1 State tests, answer keys, and solution sets available on website.

Participation Categories

Schools may enter one varsity team, at-large competitors, or JV competitors.

Varsity Team

The varsity team is composed of between 6 and 14 students who must be registered as full-time students at the school. Teams may substitute or replace members from the regional to sectional and/or sectional to state finals competition. A team may also drop members as long as they still have at least 6 members, but the number of team members cannot be increased beyond the number registered at the regional level. Exchange students enrolled as full-time students are eligible for the team and the competition **provided they are not over 18 and they have not graduated from secondary school in their home country.**

At-Large Competitors

This category is for full-time students who compete as individuals and are not on a school varsity team. This includes situations where a school competes with fewer than 5 students, and situations where a school competes with individuals in addition to a team. Home-schooled students are eligible to compete as at-large competitors in the division of their local public school.

Junior Varsity (JV)

JV participants only take the exams and are not eligible for awards. The intent of the JV category is to give students the experience of taking the Academic Challenge Competition exams, possibly for preparation for moving to the higher levels of competition in the future. Due to capacity limitations, JV students are only allowed to attend competitions with the approval of the competition host.

Advancement

Team Advancement

The number of teams advancing (regional to sectional or sectional to state finals) is determined by the following rule. Within each division if there are:

Number of Teams	Number to Advance
1 – 2	All teams advance
3 – 7	2
8 – 12	3
13 – 16	4
17 or more	5

Individual advancement from the regional to sectional competitions

Individual competitors (either at-large competitors or members of teams) will qualify to advance if they attain a subject score equal to or better than the second-place score for that subject in their division. There is no limit on the number of individual competitors that may advance. For example, if two students are tied for first place and three tied for second place, all five students will qualify to advance because they finished "in either 1st or 2nd place." These advancement rules also apply to individual members of teams whose team does not advance.

Note: Although the individuals with the three highest scores in a subject and within a division receive medallions, only the top two qualify to advance.

Individual advancement from the sectional to the state final competition

Individual competitors (either at-large competitors or members of teams that do not advance) will qualify to advance as individuals if they attain a subject score equal to or better than the second-place score for that subject in their division, **or** if they meet or exceed the Automatic Qualifying Scores for State Finals Competition listed on the following page.

All advancement criteria are applied strictly within divisions.

The team scoring calculation will not be applied to a group of competitors that have registered as at-large competitors from a single school.

Automatic Qualifying Scores for State Finals Competition

Subject	Division	Qualifying Scores
Biology	300	32
	700	33
	1500	36
	Unlimited	37
Chemistry	300	33
	700	36
	1500	37
	Unlimited	38
Computer Science	300	24
	700	23
	1500	23
	Unlimited	25
Engineering Graphics	300	22
	700	25
	1500	24
	Unlimited	28
English	300	67
	700	63
	1500	69
	Unlimited	68
Math	300	21
	700	23
	1500	20
	Unlimited	25
Physics	300	23
	700	19
	1500	26
	Unlimited	26

Scoring

Team Scores

Team scores are calculated in a manner that attempts to weight each subject equally and limit the number of scores that count in any given subject to provide some equity between smaller and larger schools within a given division.

The **raw score** for an individual given exam is the total number of correct responses given by the student on an exam. There is no penalty for incorrect responses. For each subject in which a team has earned at least two individual scores, the **team subject raw score** for a given subject is the sum of the two greatest individual raw scores earned by team members in that subject.

To equalize the contribution of the various subjects with varying numbers of questions and varying difficulties, a **normalized team subject score** is calculated. The greatest team subject raw score from all the teams participating in a school's division at the competition is determined. Each team subject raw score is multiplied by 100 and divided by the greatest team subject raw score to obtain the normalized team subject score for that particular subject.

$$\text{normalized team subject score} = \frac{100 \times \text{team subject raw score}}{\text{greatest team subject raw score}}$$

This results in a maximum normalized team score of 100 in each subject. The **total team score** is the sum of the team's normalized subject team scores in the subjects English, chemistry, and mathematics, and the team's two greatest scores in the remaining for subjects computer science, engineering graphics, biology, and physics.

Teams are ranked within their divisions by the total team score.

Example calculation of a total teams score:

Student	Biology	Chemistry	Computer Science	Engineering Graphics	English	Math	Physics
Student 1	32	28					
Student 2			25			18	
Student 3		31					15
Student 4				23	64		
Student 5	27						
Student 6						22	17
Student 7			28		68		
Student 8	21		16				
Student 9		22				24	
Student 10	33				59		

Team Subject Raw Score	$32 + 33 = 65$	$28 + 31 = 59$	$25 + 28 = 53$	0 (Only one score)	$64 + 68 = 132$	$22 + 24 = 46$	$15 + 17 = 32$
Highest Team Subject Raw Score in Division	72	64	58	38	140	46	34
Normalized Team Subject Score	$\frac{65}{72} \times 100 = 90.28$	$\frac{59}{64} \times 100 = 92.19$	$\frac{53}{58} \times 100 = 91.38$	$\frac{0}{38} \times 100 = 0$	$\frac{132}{140} \times 100 = 94.29$	$\frac{46}{46} \times 100 = 100.0$	$\frac{32}{34} \times 100 = 94.12$

The team score will be the sum of the normalized team subject scores in English, math, and chemistry added to the scores from computer science and physics.

$$\text{Team Score} = 94.29 + 92.19 + 100.00 + 91.38 + 94.12 = 471.98$$

Individual Scores

Individual scores are the raw test scores on each exam. These test scores are used to determine awards and advancement for each subject in each division.

Awards

Team Trophies

At the regional and sectional levels, the three top-scoring teams in each division will be awarded first-, second-, and third-place trophies. In case of ties, duplicate trophies will be awarded. In the case where only one school is competing in a division, no team trophy will be awarded. However, the students in the teams are still eligible for individual medallions. It is important to note that even though the school is not eligible for a team trophy, they still automatically advance.

At the state finals level, the five top-scoring teams in each division will be awarded first-through fifth-place trophies. In case of ties, duplicate trophies will be awarded. Trophies will be awarded to the top boundaried and to the top non-boundaried schools in the 300 division at the state level.

Team Ribbons

Team ribbons are given to members of a varsity team that wins a trophy. Because the trophy will be stored at school, team members receive the ribbons to acknowledge their achievement.

Medallions

Both team members and at-large competitors are eligible to receive individual medallions. At the regional and sectional competitions, first-, second-, and third-place medallions will be awarded to individuals receiving the highest, second highest, and third highest raw scores respectively on each subject test within a division. At the state competition, first-, second-, third-, fourth-, and fifth-place medallions will be awarded to individuals receiving the highest, second highest, third highest, fourth highest, and fifth highest raw scores respectively on each subject test within a division.

Competition Day Schedules

Each host institution is scheduling their own competition time within the range of dates for the competition. Coaches may set their own schedule. It is recommended that coaches have students in place five to ten minutes before the exams are to be started to get settled and logged in to the exam site.

General Information

Translation Dictionaries

Foreign Exchange students are allowed to use non-electronic translation dictionaries for tests other than the English test. Permission must be obtained from the ACES office prior to the first competition, and the ACES office will notify each site coordinator in advance that the student will be bringing a dictionary to the test. Electronic translation dictionaries are not allowed in the testing room.

Individual Advancers – Reinforcement of Existing Rules

Individual competitors (either at-large competitors or members of teams) will qualify to advance if they attain a subject score equal to or better than the second-place score for that subject in their division. This qualification for advancement attaches to the specific competitor and therefore at-large competitors who advance to the next level or individual members of teams who advance when their team does not advance **cannot be replaced** by other students.

Wild Card Advancement

There will be a wild card playoff for both the regional and sectional competitions. One team from each division will advance as the wild card winner at both the regional and sectional levels. The winners will be determined by the ACES office at the end of each level of competition.

Frequently Asked Questions:

1. Can I replace a student?

For Regionals, if you are aware a teammate cannot make it prior to the roster being locked, you can go into your coach's site and make the replacement there. If it is after the roster has been locked but before the competition, you will need to contact the site coordinator immediately to notify the change. If there is an emergency (sickness, emergency, conflict in schedule that can't be avoided) the day of competition, you can have the replacement student attend but they must take the tests that the original student had signed up for.

In regards to Sectionals and State, the rules regarding switching rosters are as follows:

- At-large competitors who advance to the next level or individual members of teams who advance when their team does not advance **cannot be replaced** by other students.
- Team members, however, can be replaced by other students.
- The chosen tests for students can be changed.

2. When will results be posted?

Results will be posted on the website within 7 days after the last competition at a given level. You can find them at: https://castle.eiu.edu/academic_challenge/results.php. You can also find detailed results for your students by logging in using your coach's account.

3. What do I do if a student has a question about a question on the test?

Have the student make note of the test subject and test question during the test. After the test, the coach will collect the note from the student. They will then notify the Academic Challenge office of the issue. No discrepancies will be handled the day of competition as the Academic Challenge office may need to collaborate with the authors for a fair solution or clarification on the question. Scores may be reconsidered based on the nature of errors in exams discovered during test administration.

4. During competitions, what are my job duties?

Coaches will make certain their students are able to log in to the site and get started on the exams. Coaches may be required to serve as exam proctors at some competition sites.

5. Are there Academic Challenge T-shirts?

Possibly. We are working on the possibility of making official Academic Challenge T-shirts available for purchase. Coaches will receive an email update on that possibility.

6. Who do I contact with questions?

You should contact the site coordinator for questions about an upcoming competition. For other questions, contact the Academic Challenge Director, Douglas Brandt, at debrandt@eiu.edu . Please include “Academic Challenge” in the subject of emails.