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We're Not in Kansas Anymore: Perception vs. Reality of Transfer Student Performance in STEM Disciplines

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State University of New York The College at Brockport

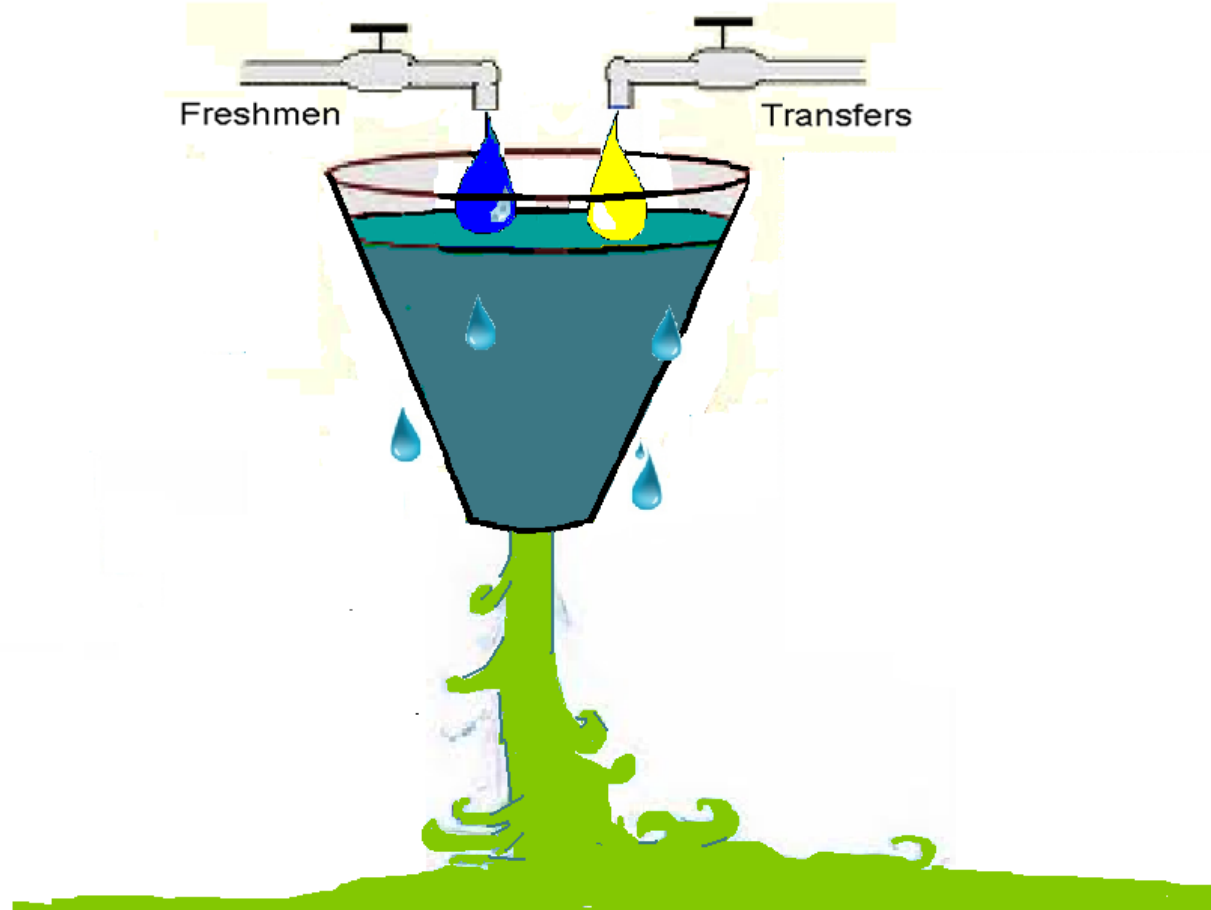
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- Total undergraduate enrollment – 7,100
- New Freshmen – 1050
- New Transfer Students – 1,300
- Public
- Masters
- Selective
- Comprehensive



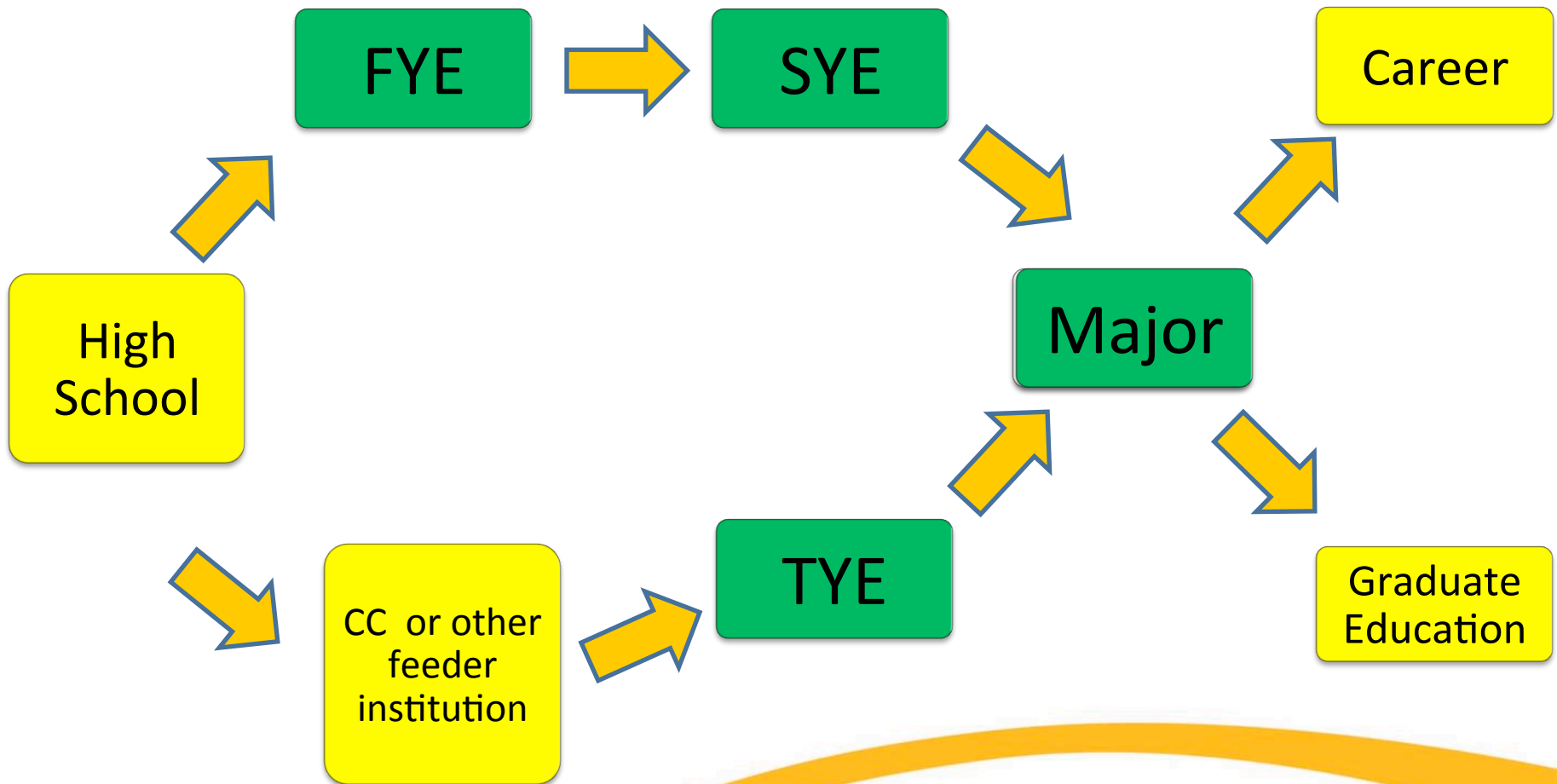
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The Mixture

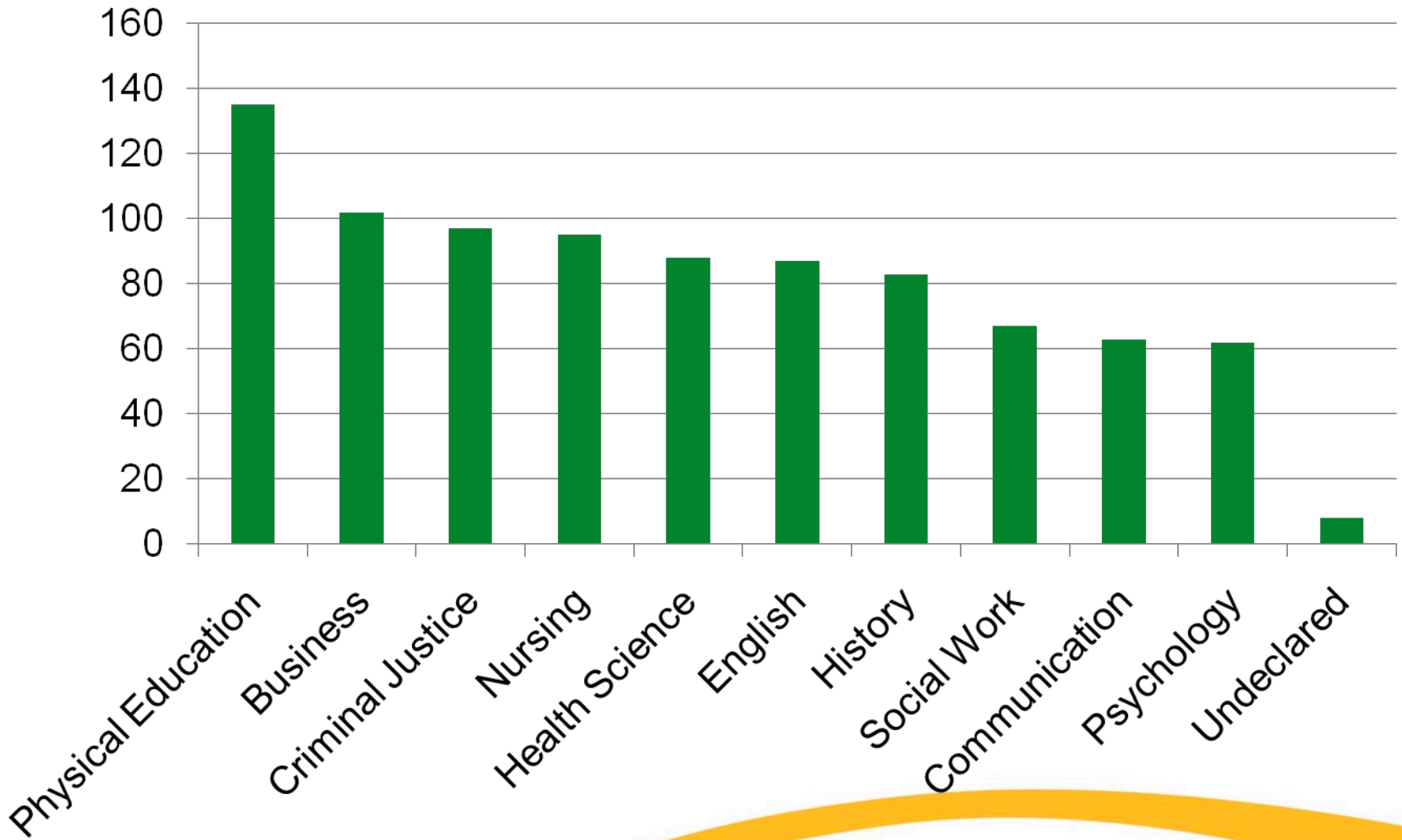


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“Student Life Cycle”



Majors



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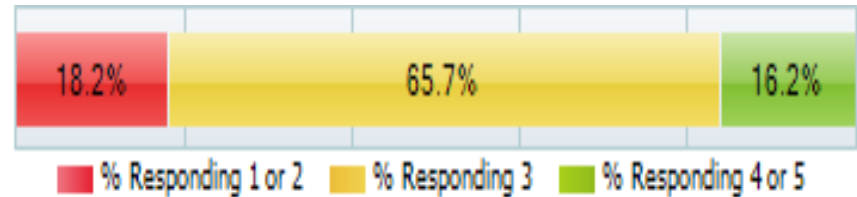
Foundations of Excellence® in the First College Year (Transfer Focus)

Student Survey

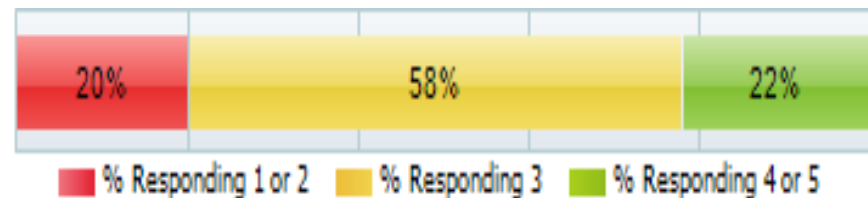


To what degree is the course appropriate for your level of academic preparation regarding mathematical skills?

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Select 6 :



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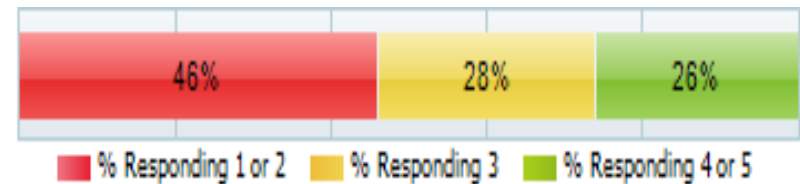
Foundations of Excellence®

Faculty/Staff Survey

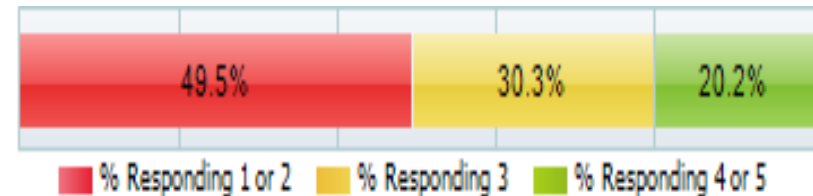


To what degree does the institution encourage academic departments to develop common course outcomes with like departments at institutions from which you typically receive transfer students?

The College at Brockport :



Select 6 :



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Recommendations



- 3c. Provide to faculty useful demographic and other important information regarding transfer students.
- 3d. Provide timely, consistent and open communication about transfer students to feeder institutions



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Why STEM? Why NOW?

- Increased opportunity for faculty feedback
 - Position of transfer-year experience coordinator
 - Transfer counselor workshops
 - STEPS for transfers
- Foundations[®] recommendations
- College goal to become *A Nationally Recognized Comprehensive Master's Institution Focused on Student Success*
- Phase 4: Implementation of *The Power of SUNY*



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Chemistry Courses

CHM 206 - College Chemistry II

Course fee. Prerequisite: CHM 205. Covers strong and weak electrolytes, reactions, buffer systems, structure and bonding of coordination complexes, kinetics, homogeneous and heterogeneous equilibrium, thermodynamics, chemical equations and quantitative problems. Three hours lecture and three hours lab per week.

4 Credit hours

CHM 406 - Physical Chemistry II

Prerequisite: CHM 405. Kinetic-molecular theory of gases; kinetics; thermodynamics, with an introduction to statistical thermodynamics; and applications of thermodynamics to phase equilibria and chemical equilibria. Three hours of lecture per week.

3 Credit hours

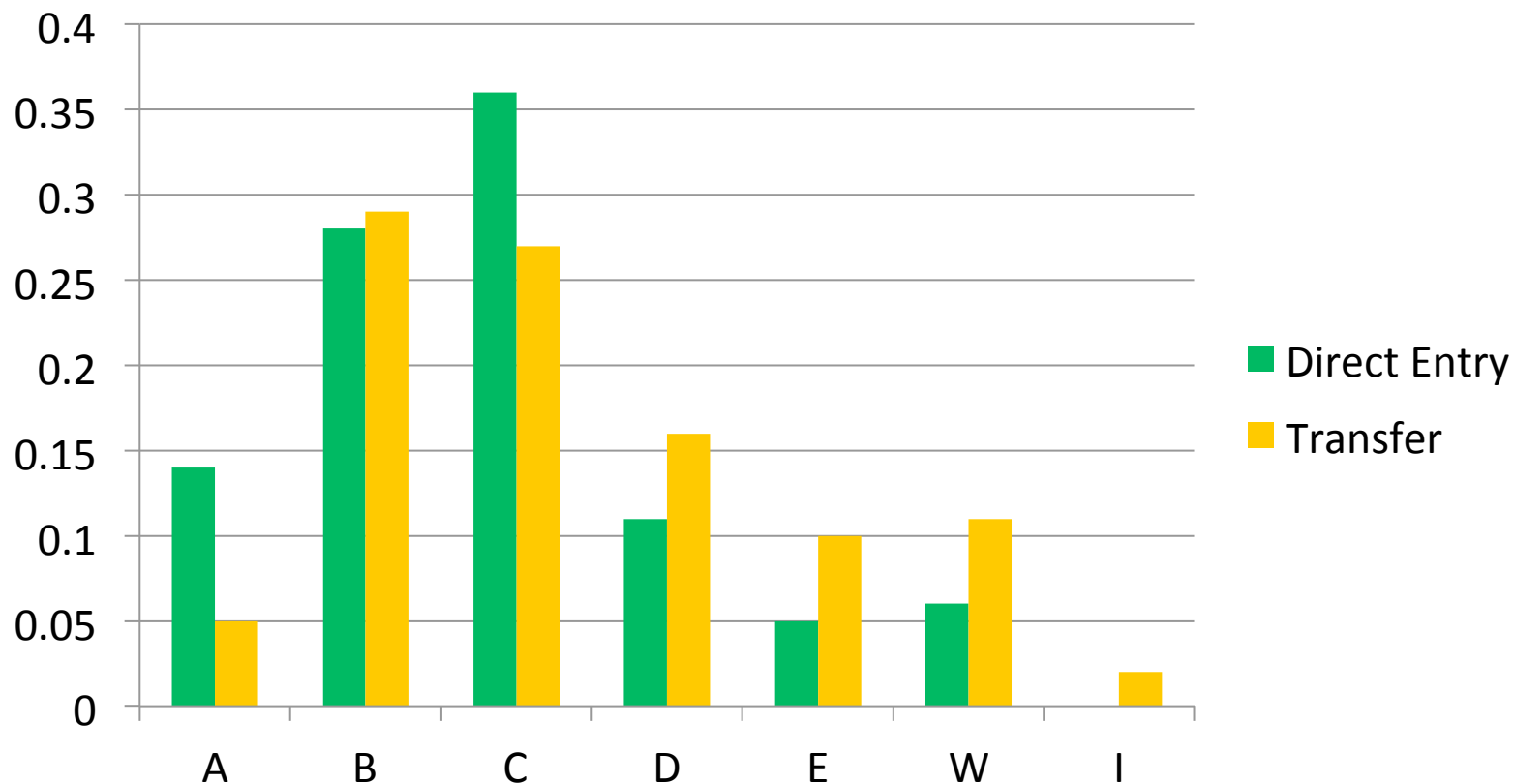


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CHM 206 – College Chemistry II

233 Direct Entry (79%)

62 Transfer (21%)

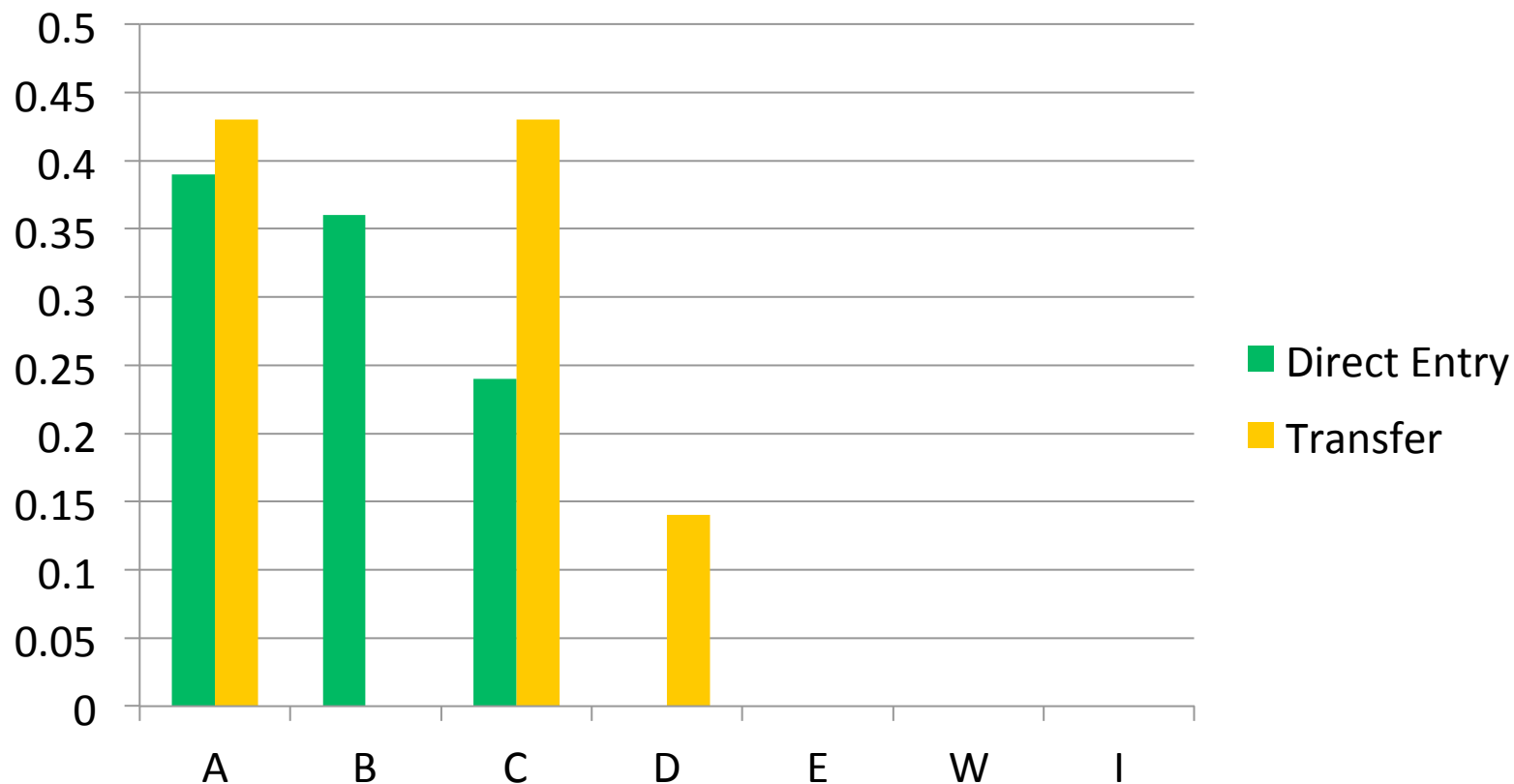


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CHM 406 – Physical Chemistry II

33 Direct Entry (83%)

7 Transfer (17%)



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Biology Courses

BIO 201 - Biology I

For majors in biological sciences: (BIO 201 and 202 are not sequential; either may be taken first). Provides an integrated exploration of the fundamentals of biology as a science, the nature and origin of life, biological chemistry, cell biology, genetics and evolution. Draws upon plants, animals and microbes to illustrate structure and function relationships.

4 Credit hours

BIO 415 - Molecular Biology

Prerequisites: BIO 301, BIO 302 and CHM 305. Covers the biosynthesis and function of macromolecules, especially nucleic acids. Includes topics in regulation, molecular virology, transposition and transformation, as well as recombinant DNA methods. Biology majors only or with instructor's permission.

3 Credit hours

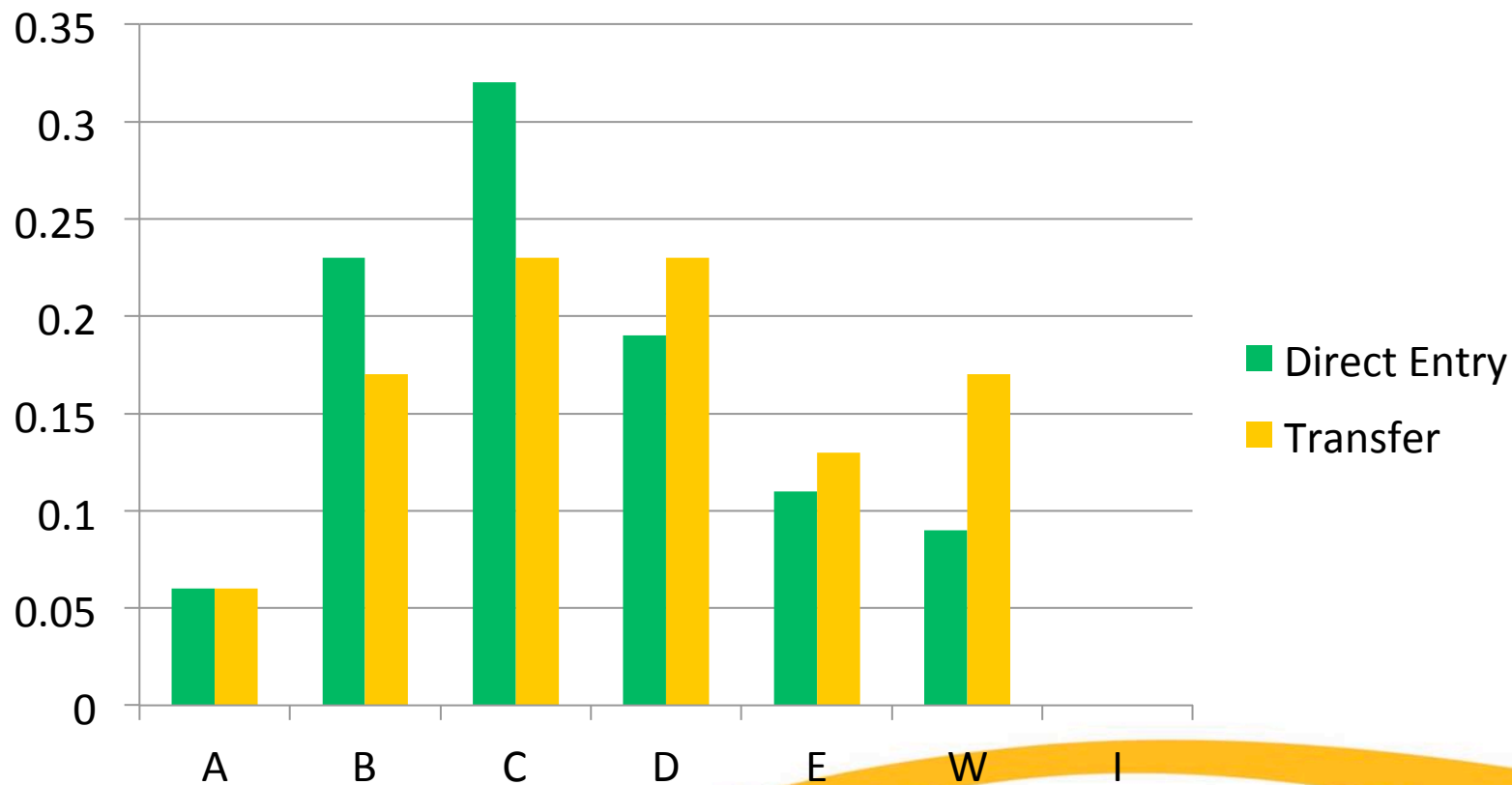


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BIO 201 –Biology I

109 Direct Entry (70%)

47 Transfer (30%)

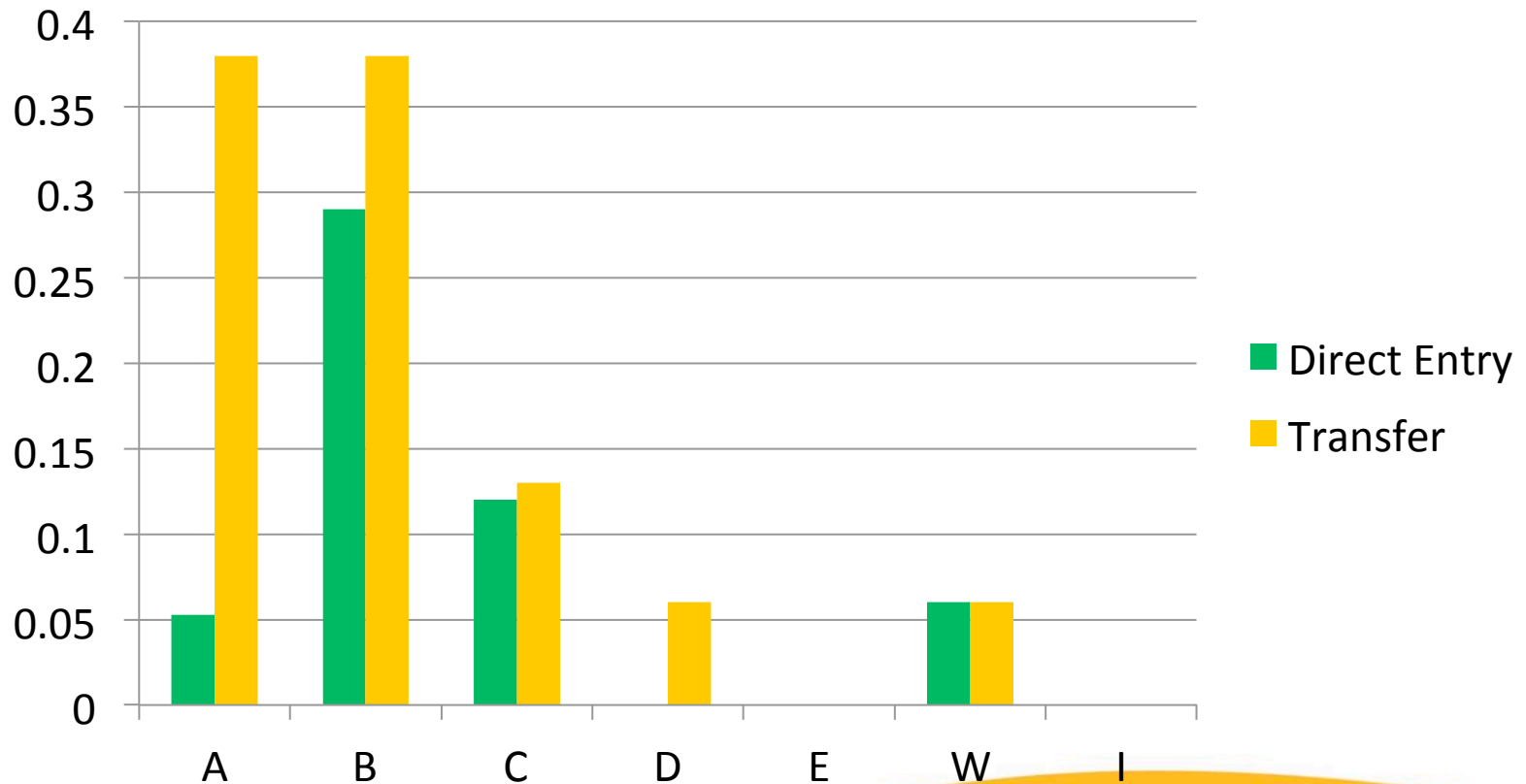


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BIO 415 –Molecular Biology

17 Direct Entry (52%)

16 Transfer (48%)



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Mathematics Courses

MTH 201 - Calculus I

Prerequisite: MTH 122 or a sufficiently high score on the Regents Math B exam. Covers limits and continuity; derivatives and integrals of algebraic, trigonometric, exponential, and logarithmic functions; and applications of the derivative.
4 Credit hours

MTH 457 - Real Analysis

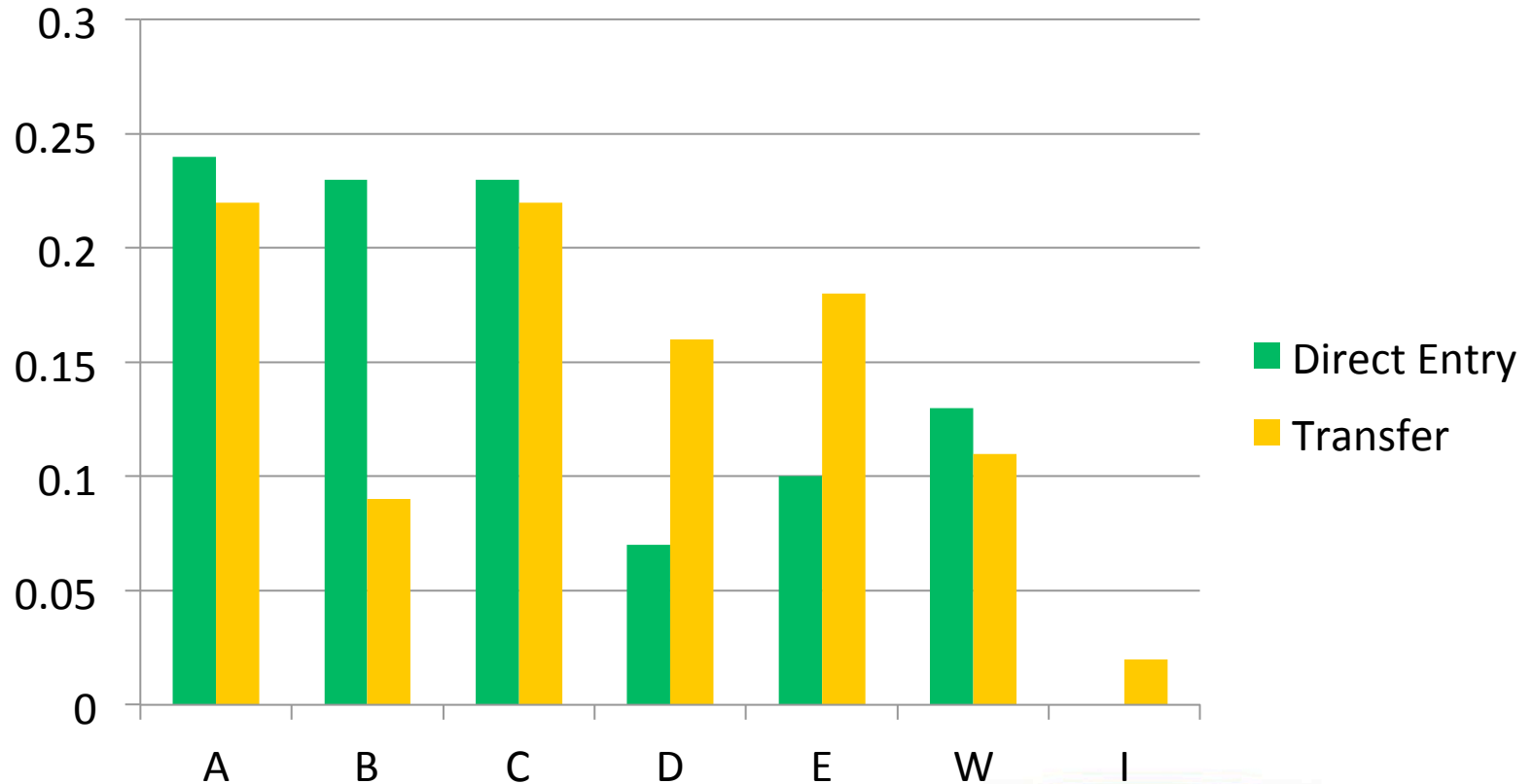
Prerequisites: MTH 203 and MTH 324. Provides a study of functions of a real variable. Emphasizes theory, proof techniques, and writing skills. Includes: real numbers, denseness of the rational numbers, convergence of sequences of real numbers, Cauchy sequences, Bolzano-Weierstrass theorem, continuous functions, uniform continuity, differentiable functions, and integrable functions. Enhances understanding of the topics through a series of required writing tasks.
3 Credit hours



MTH 201 – Calculus I

147 Direct Entry (73%)

55 Transfer (27%)

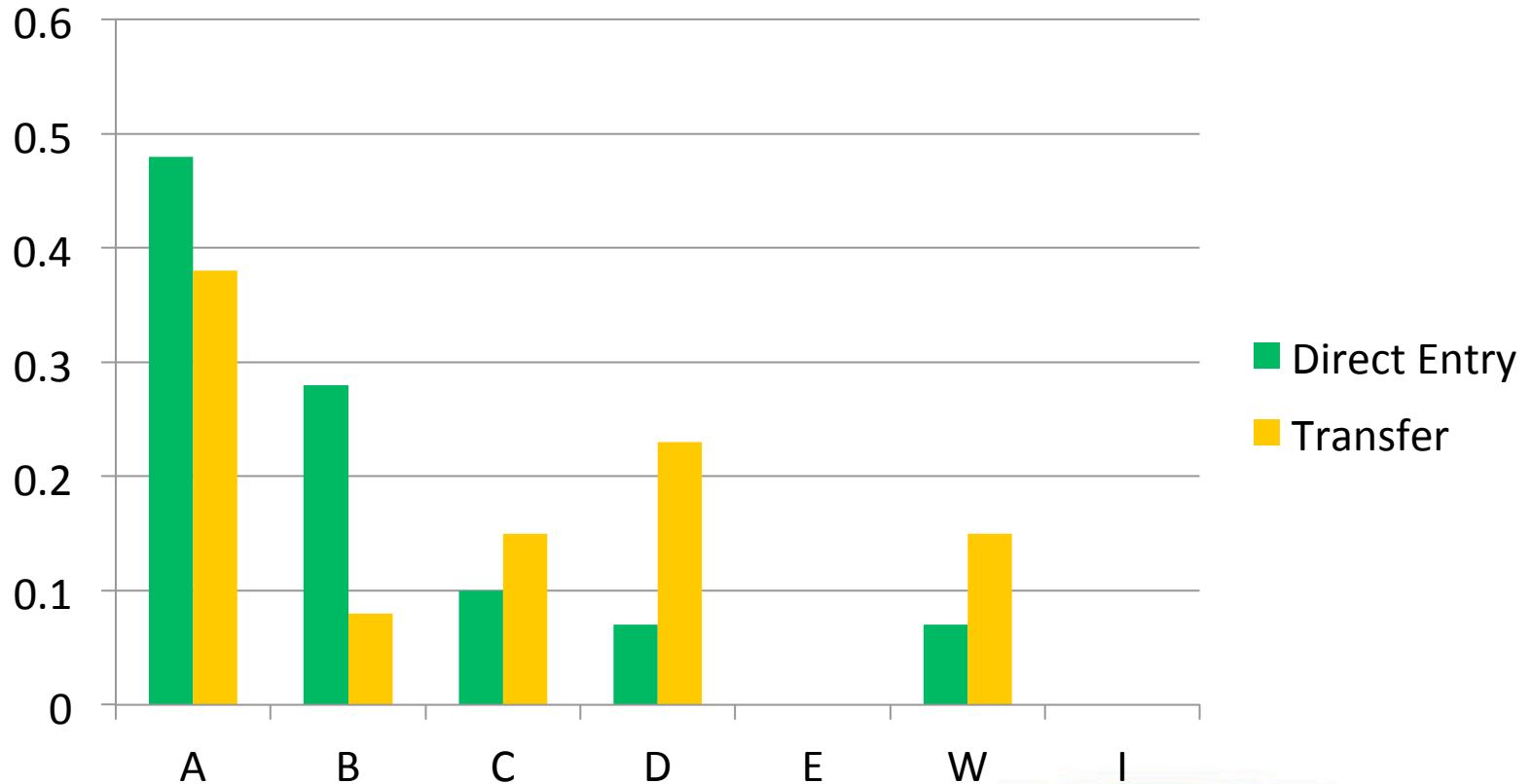


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MTH 457 – Real Analysis

29 Direct Entry (69%)

13 Transfer (31%)



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Computer Science Courses

CSC 203 – Fundamentals of Computer Science I

Prerequisites: CSC 120 and MTH 122. Covers fundamental computer science concepts and object-oriented program development in Java. Includes these topics: problem solving, algorithm design and implementation; program testing and documentation; primitive data types, data manipulation, selection, loops; classes, methods, parameters, inheritance; arrays, strings, files, introduction to sorting and searching techniques and other basic algorithms. Requires extensive programming and supervised laboratory sessions.

4 Credit hours

CSC 406 – Algorithms & Data Structures

Prerequisites: CSC 205 and MTH 481. Covers design and analysis of data structures and associated algorithms using object-oriented methods. Includes these topics: complexity measures, pre-and post-conditions, programming to interfaces, union-find sets, hashing, trees (AVL, splay, B-Trees), graphs, recursion, algorithm design strategies and NP-completeness. Extensive programming.

3 Credit hours



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Computer Science Courses

CIS 427- Project Management & Practice

Prerequisites: CIS 317. Introduces software development and management of the development process. Includes these topics: managing the software life cycle (requirements definition, logical design, physical design, implementation, testing, system integration, maintenance); design techniques (structured, event-driven, object-oriented); implementation; testing and software quality assurance; delivery and user training; metrics for project management and system performance evaluation; management expectations; personnel management, cost analysis and change management; management of behavioral and technical project aspects.

3 Credit hours

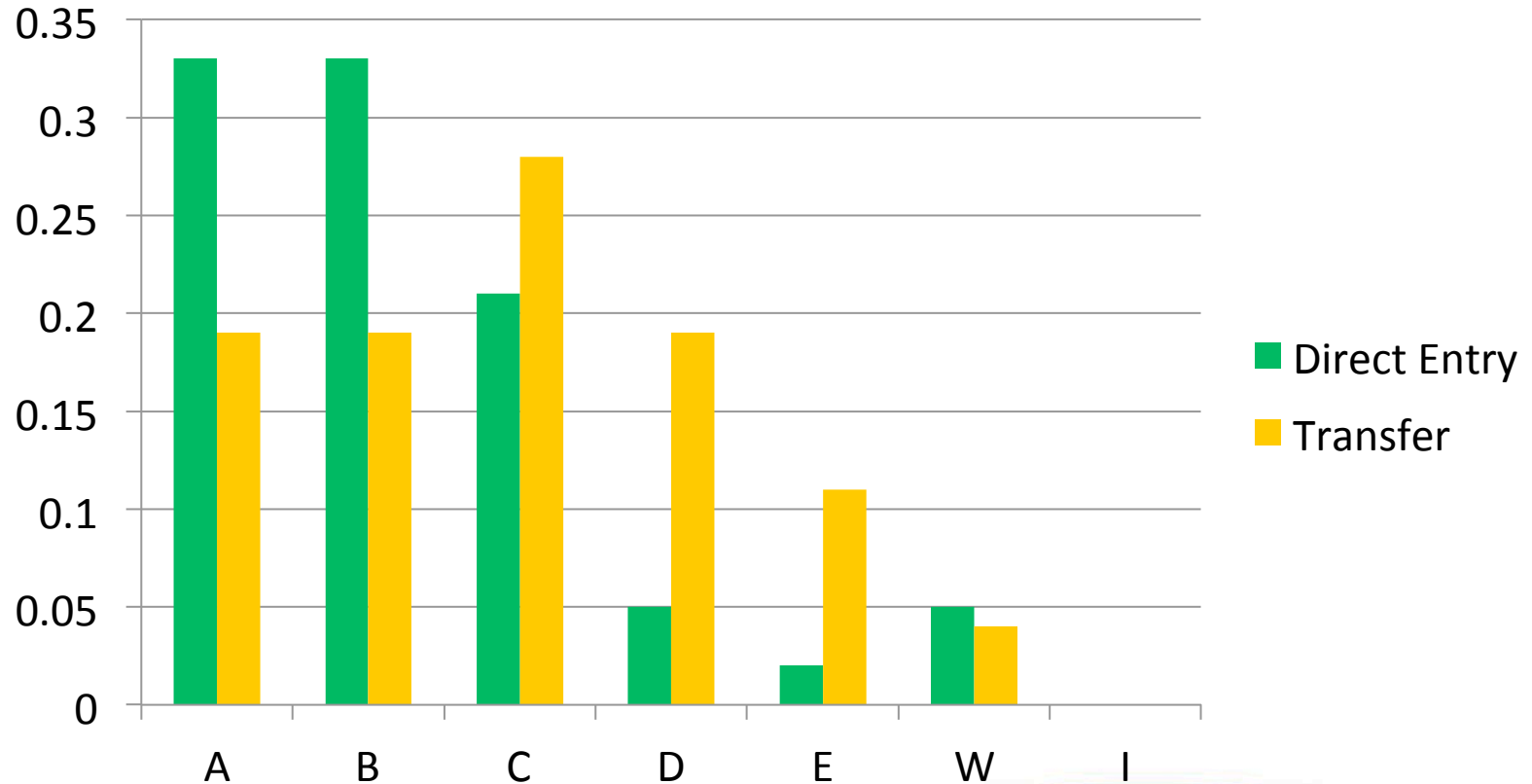


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CSC 203 – Fundamentals of Computer Science I

57 Direct Entry (55%)

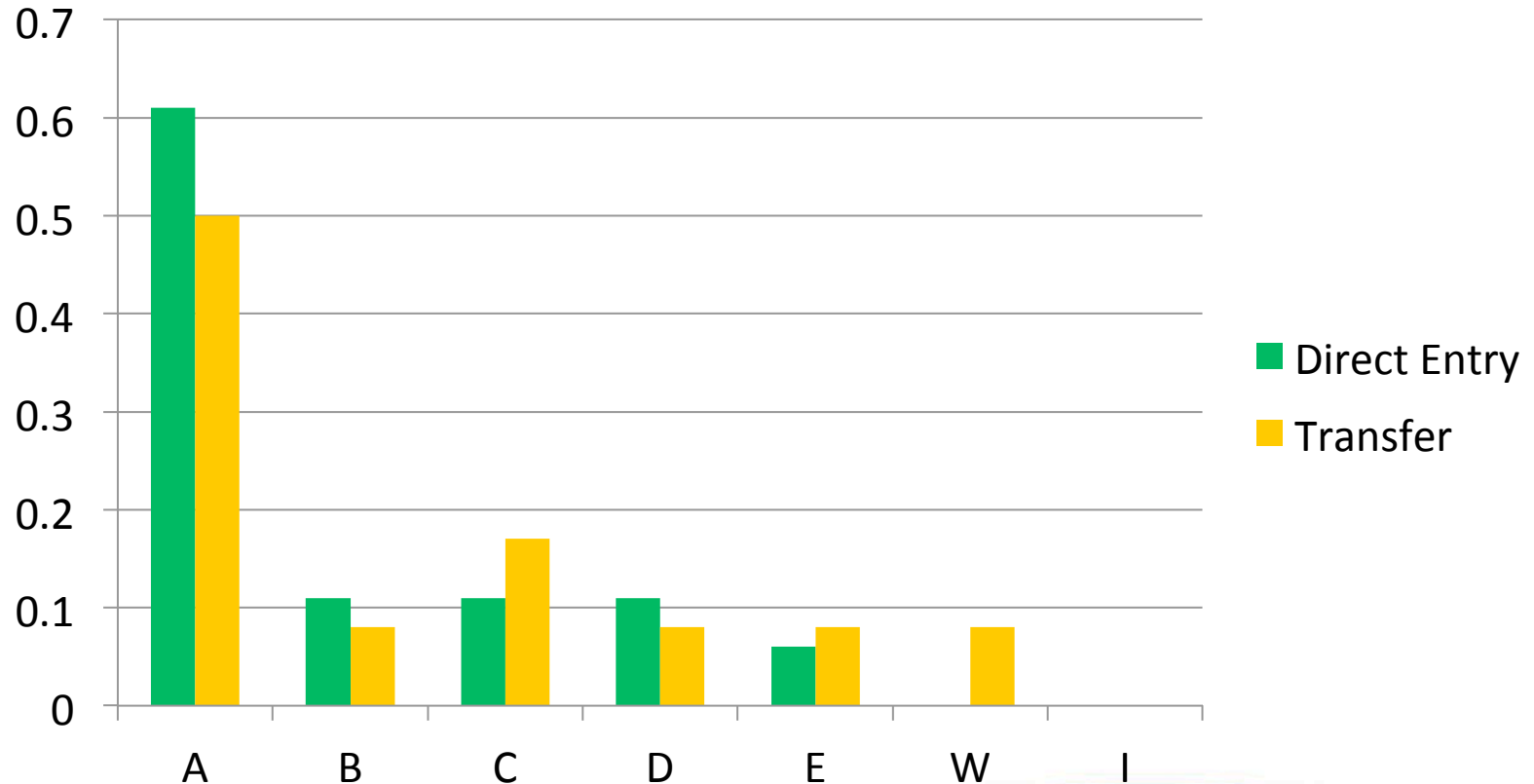
47 Transfer (45%)



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CSC 406 – Algorithms and Data Structures

18 Direct Entry (60%) 12 Transfer (40%)

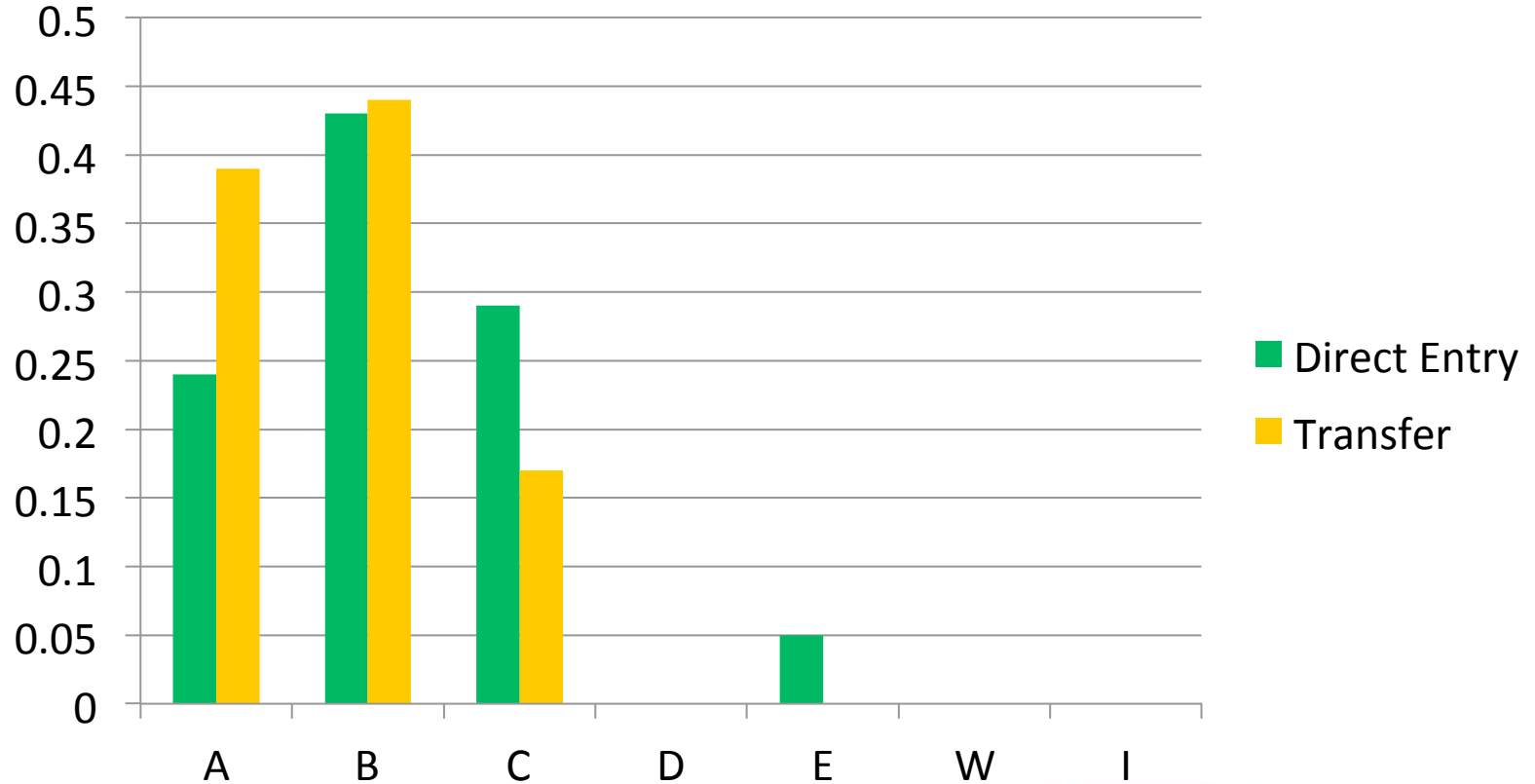


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CIS 427 – Project Management and Practice

21 Direct Entry (54%)

18 Transfer (46%)



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Environmental Science Courses

ENV 202 - Environmental Science

Required for majors. Open to non-majors. Environmental Science is an interdisciplinary study combining ideas and information from the natural and social sciences. The eight integrated themes of lecture and discussion are biodiversity, sustainability, connections in nature, pollution and its prevention, population growth, energy consumption and efficiency, solutions to environmental problems, and the importance of individuals changing their lifestyles and working with others to bring about environmental change. Laboratory and field activities emphasize hands-on applications of environmental science methods, problem solving, and proper writing of laboratory reports.

4 Credit hours

ENV 492 - Global Environmental Issue

This capstone course for senior environmental science majors will explore one or more major global environmental issues during the semester. Students will research the topic, analyze primary literature, engage in class discussion and formal speaking, and write a paper critically evaluating the issue and what should be done about it.

3 Credit hours

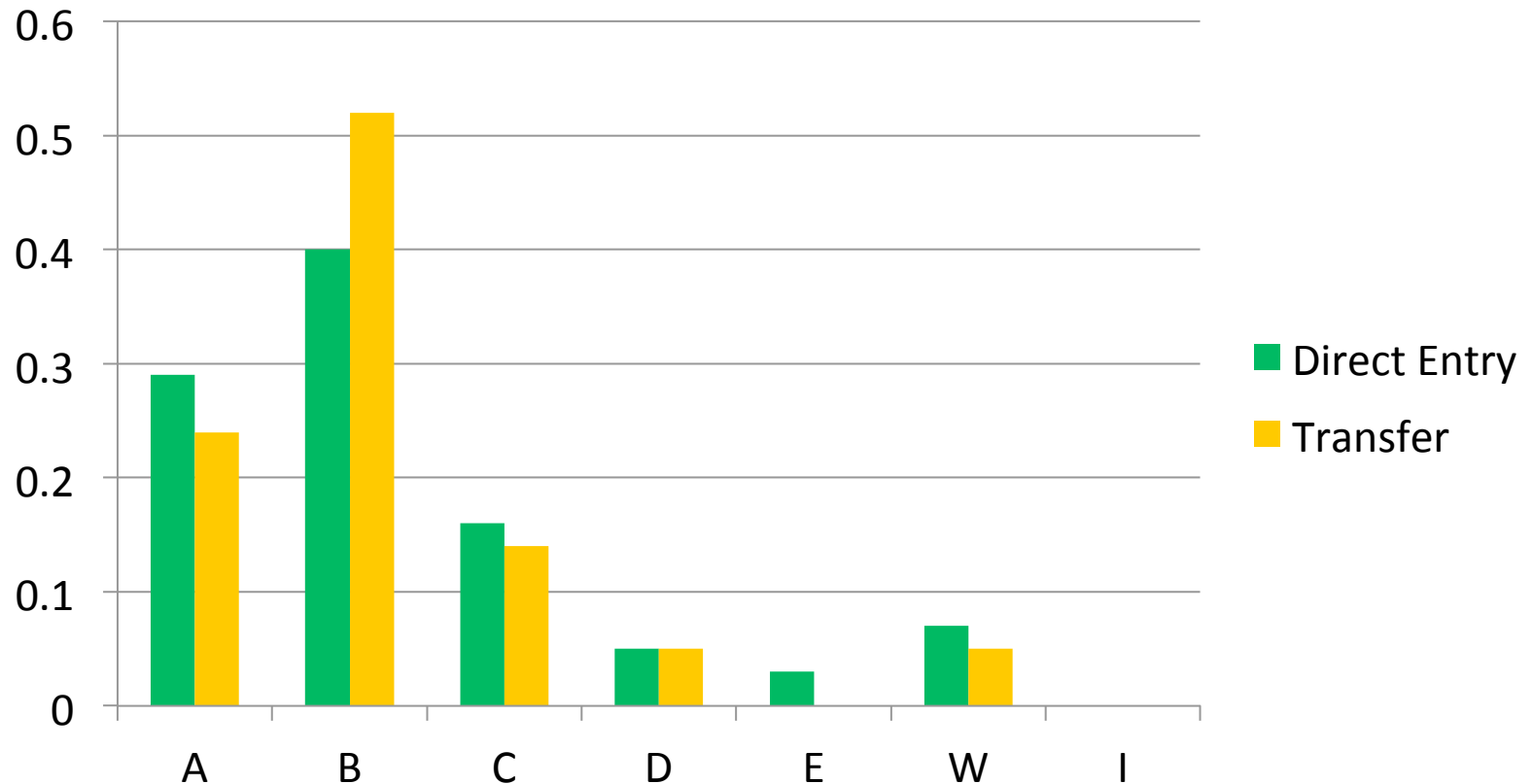


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ENV 202 – Environmental Science

58 Direct Entry (73%)

21 Transfer (27%)

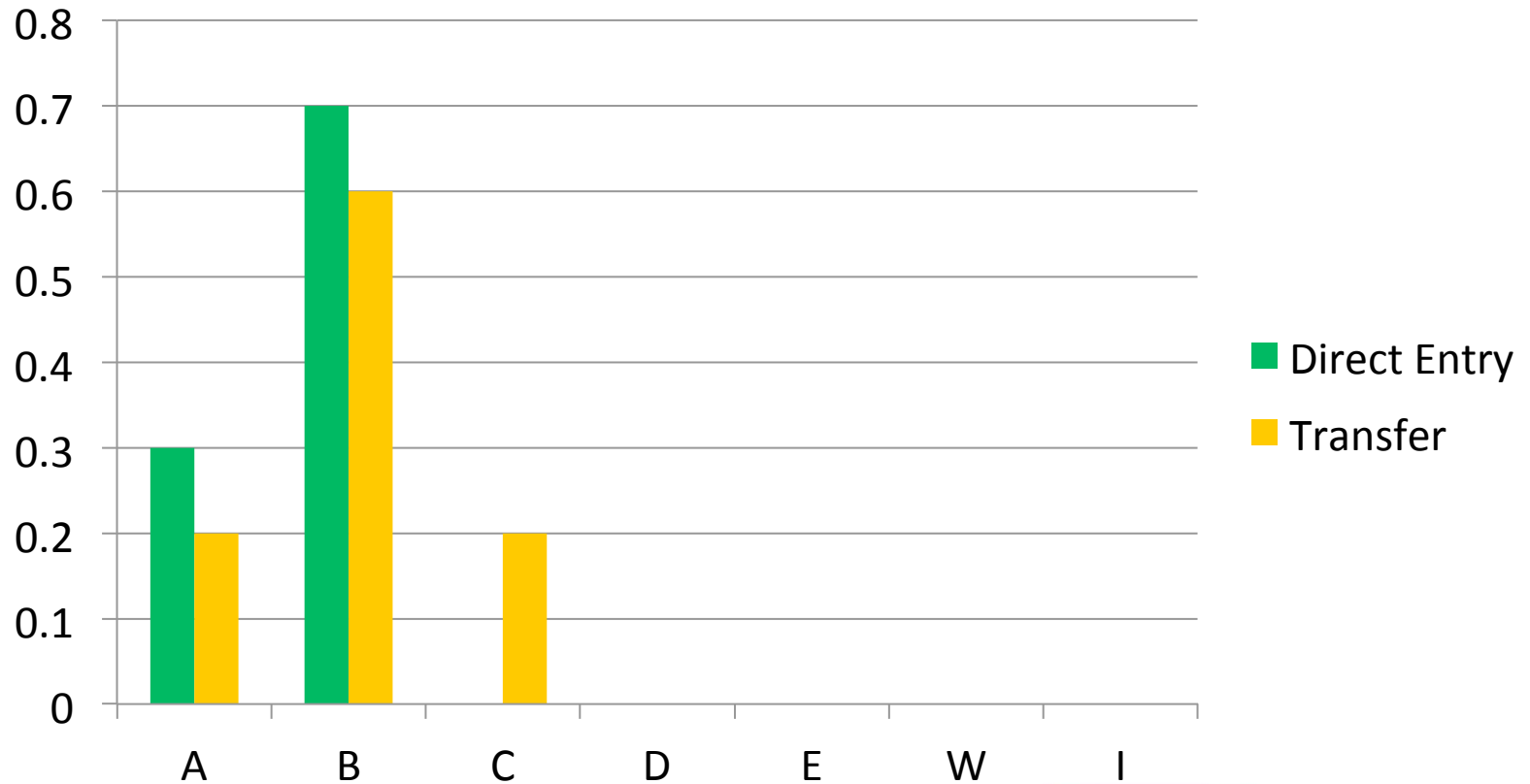


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ENV 492– Global Environmental Issues

10 Direct Entry (50%)

10 Transfer (50%)



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Earth Science Courses

GEL 201 – Intro to Physical Geology

Covers processes that form physical environments of the earth and principles used to interpret rocks, landscapes, and geologic events. Includes tectonic processes, mineral and rock formation, measurement of geologic time, volcanoes, earthquakes, surface and groundwater, glaciers, landforms, and mountain-building. Laboratories focus on rock and mineral identification, and interpretation of topographic and geographic maps. Required local field trip during lab session.

4 Credit hours

ESC 494 - Senior Research

Prerequisites: ESC 350, ESC 391 and senior status. In depth consideration of an earth sciences topic beyond formal course offerings; development of a scientific research project. The project proposal, bibliographic research, and data collection will be developed both as written document and oral presentation in a critical, professional setting to faculty and students.

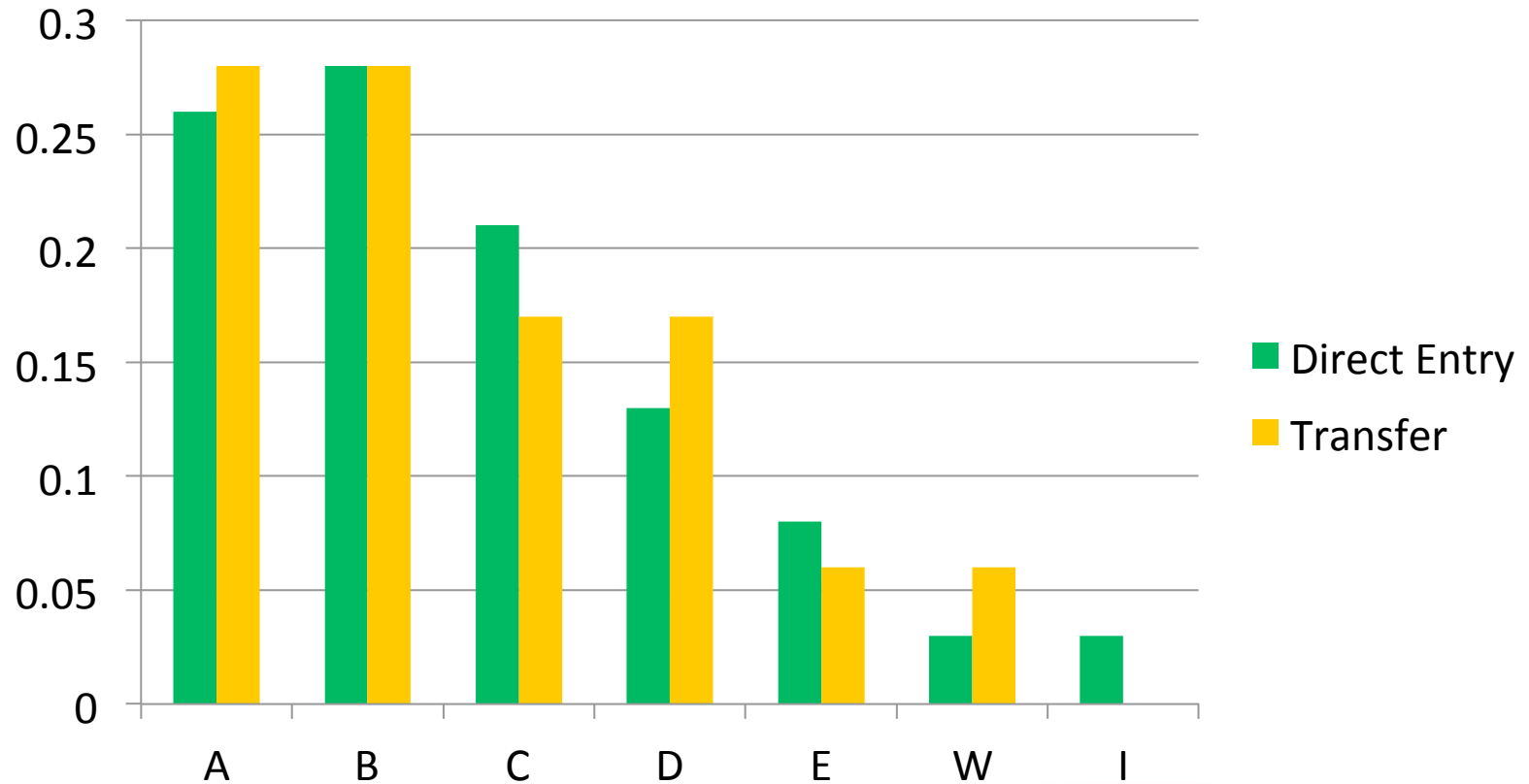
1 Credit hours



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GEL 201– Intro. to Physical Geology

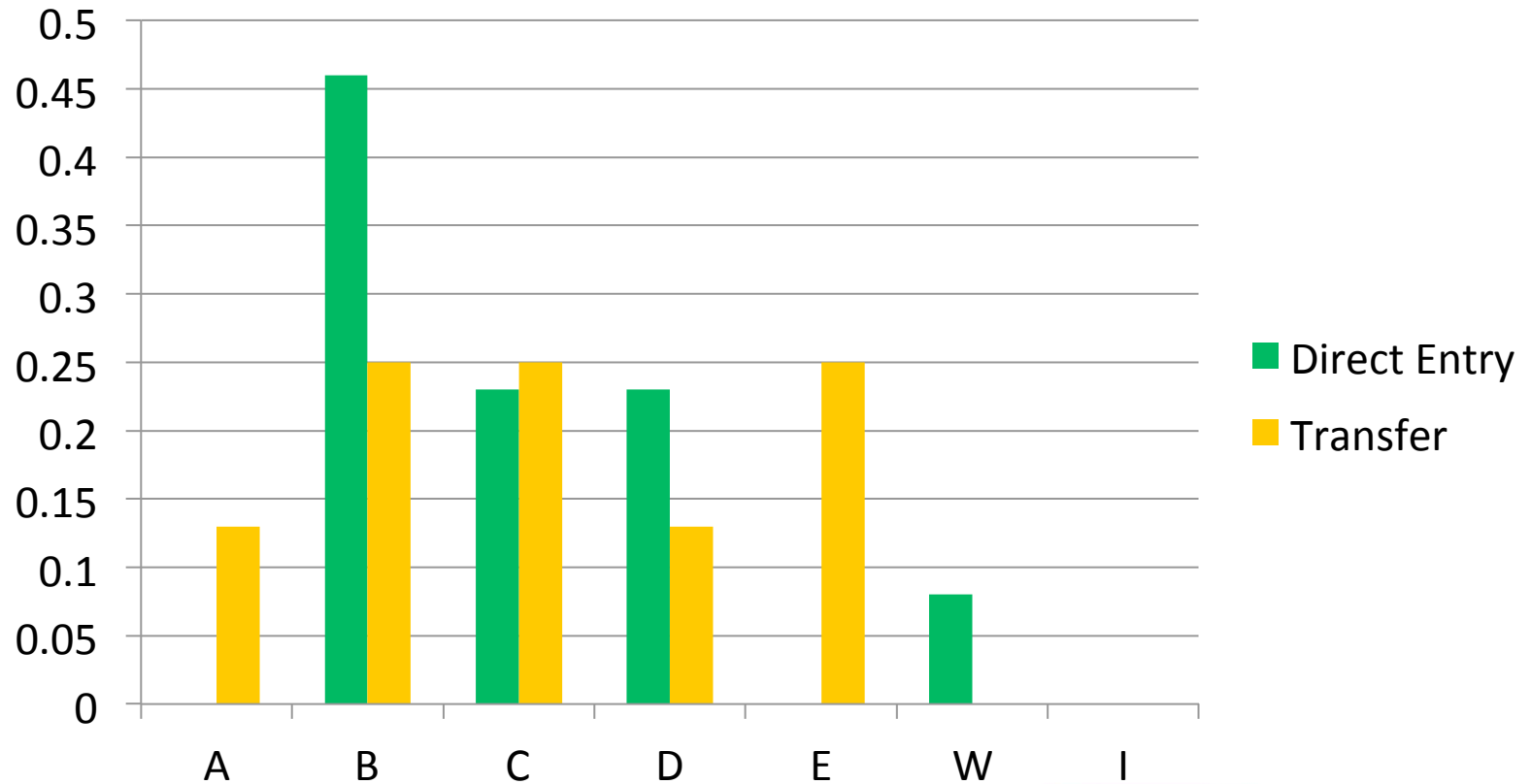
39 Direct Entry (68 %) 18 Transfer (32%)



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ESC 494– Senior Research

13 Direct Entry (62%) 8 Transfer (38%)



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Physics Courses

PHS 235 - Physics I

Corequisite: MTH 201. Calculus-based introductory physics. Introduces the fundamentals of mechanics from Kinematics to Newton's laws, energy, momentum and their conservation laws, rotational and harmonic motions, then statics and equilibrium. Experiments explore the topics covered in the lectures. Three hours of lecture and three hours of lab per week. 4 Cr. Fall.

4 Credit hours

PHS 426 - Advanced Theoretical Physics

Explores topics in Classical Mechanics, Electromagnetism, and Quantum Mechanics beyond those covered in PHS 353, PHS 368, and PHS 411. Topics may include: the Lagrangian and Hamiltonian formulations of mechanics, normal modes and coupled oscillations; electromagnetic waves, potentials and fields, radiation; approximation methods in quantum mechanics, scattering theory, multiparticle systems, the Dirac Equation.

3 Credit hours

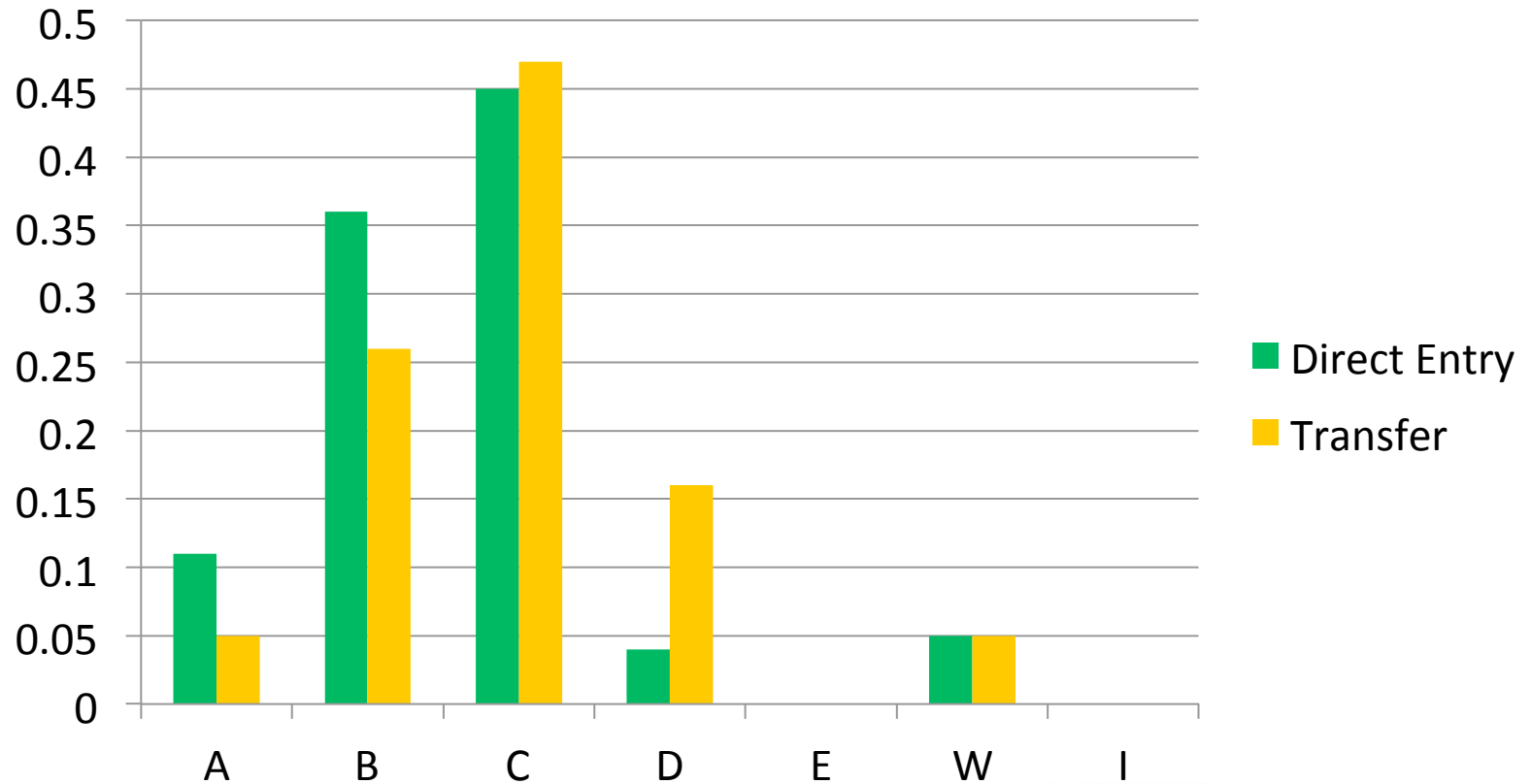


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PHS 235 –Physics I

56 Direct Entry (75%)

19 Transfer (25%)

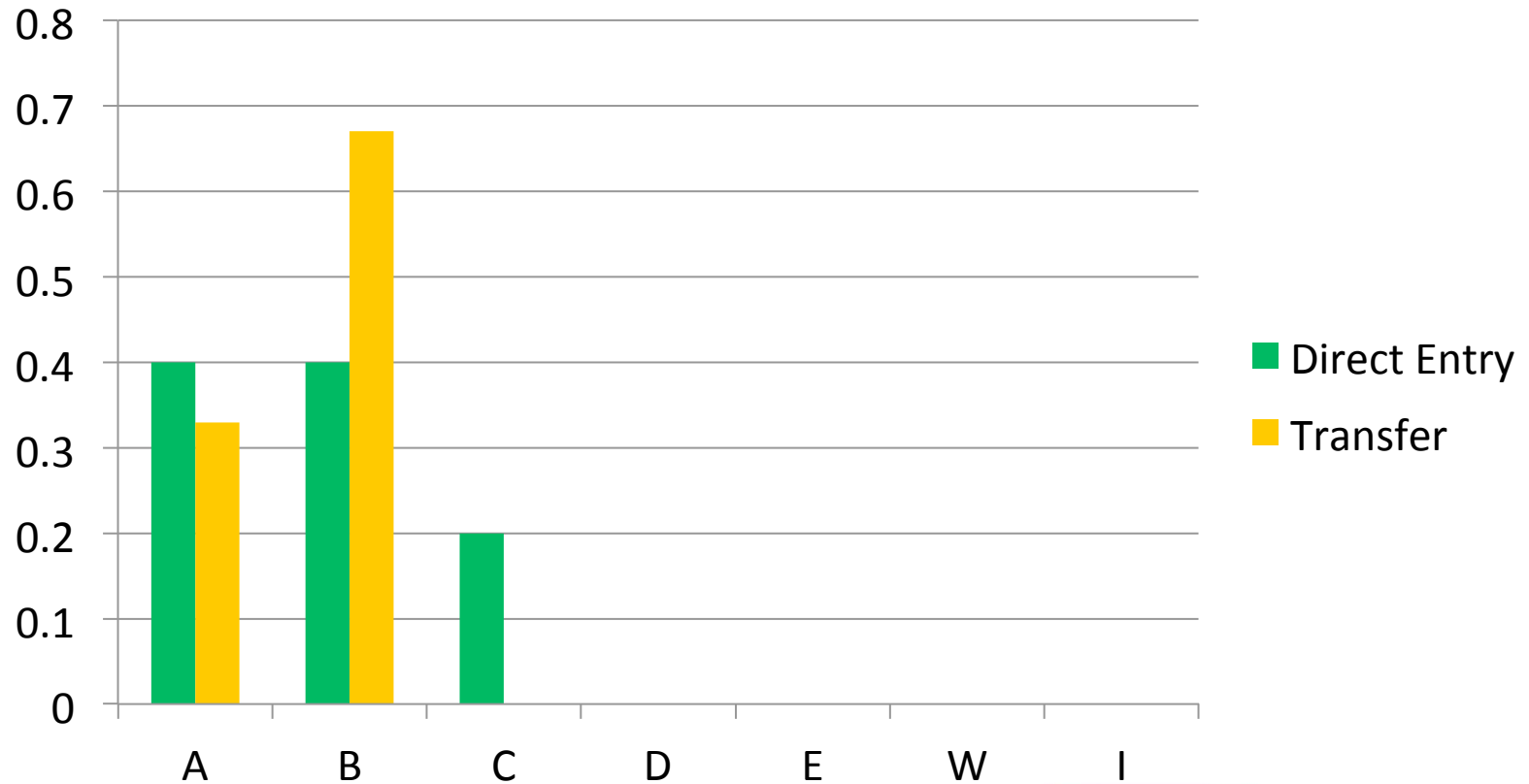


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PHS 426 –Advanced Theoretical Physics

5 Direct Entry (63%)

3 Transfer (37%)



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Computational Science Courses

CPS 201 - Computational Tools I

Prerequisites: CSC 120 or CPS 101. An introduction to fundamental concepts of computational science using the Fortran 90 programming language, and the clear and concise written presentation of scientific results. Topics include: the Fortran 90 language, program construction and debugging, consequences of finite precision arithmetic, basic machine constants, and modeling of simple physical situations. May also include other modeling tools such as Stella, Agent Sheets, and Project Interactivate. Extensive programming required.

3 Credit hours

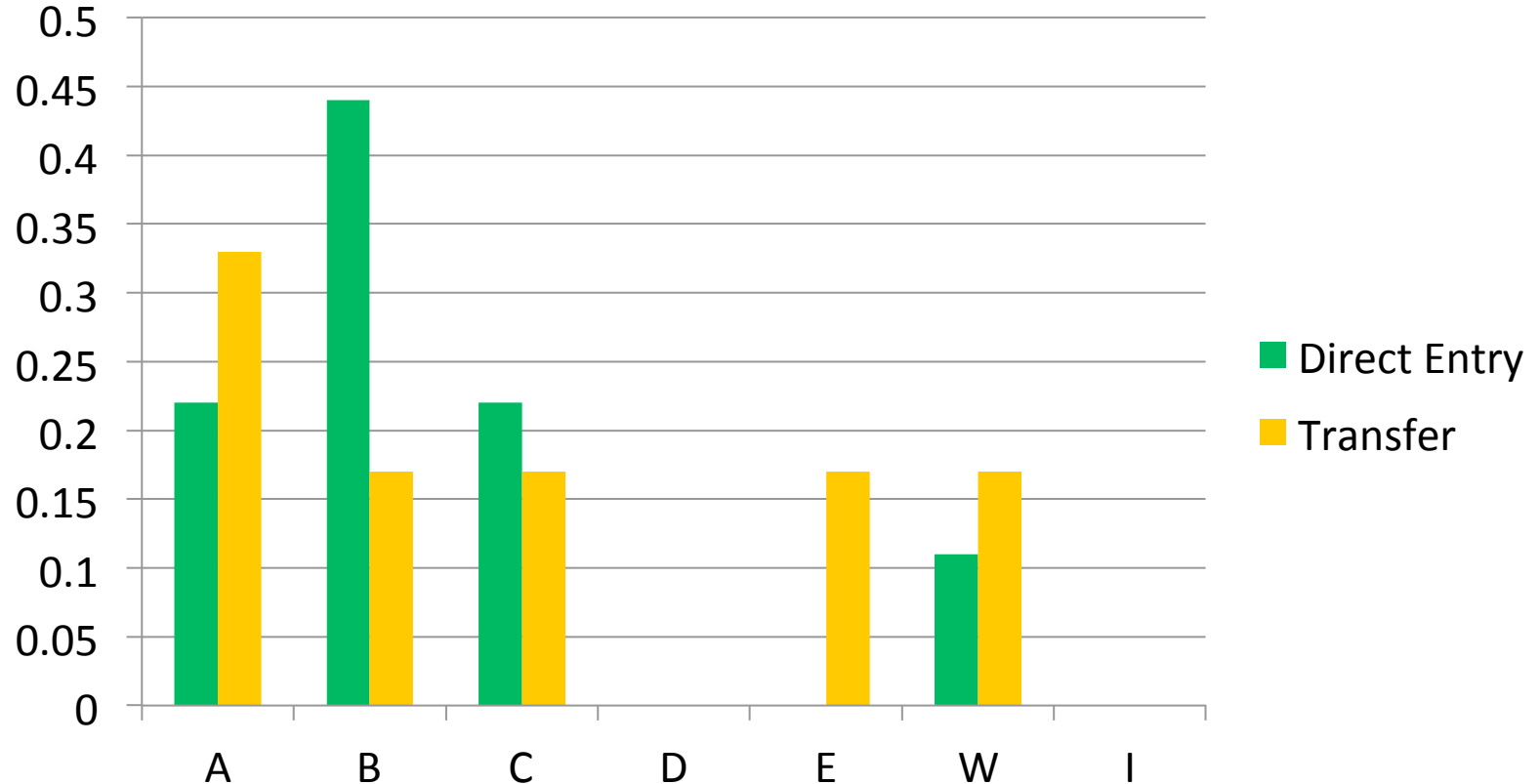


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CPS 201– Computational Tools I

9 Direct Entry (60%)

6 Transfer (40%)



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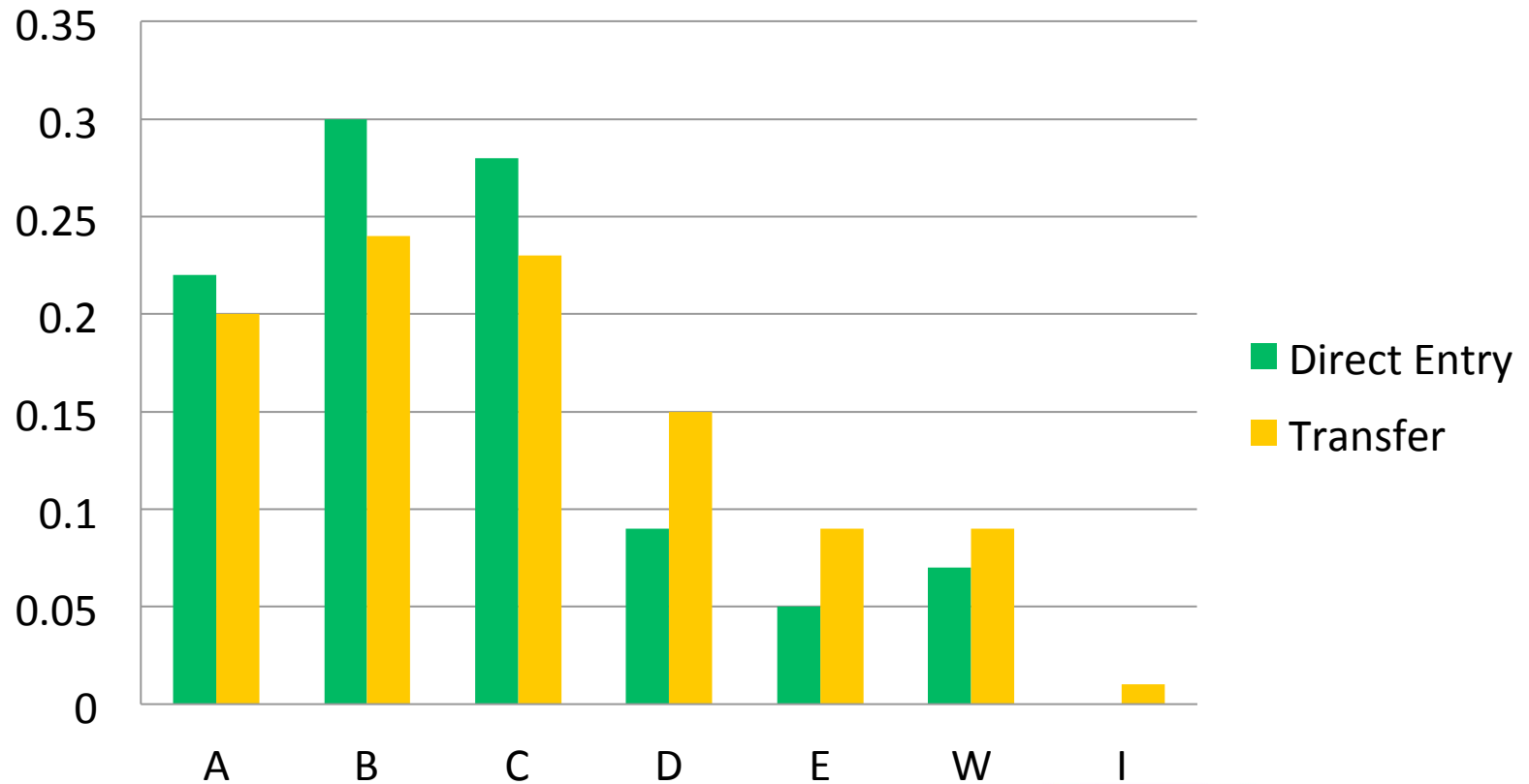
Okay...?

- There seems to be a pattern (a greater percentage of direct entry students seem to be getting the better grades)
- Combine all grades and check for significance



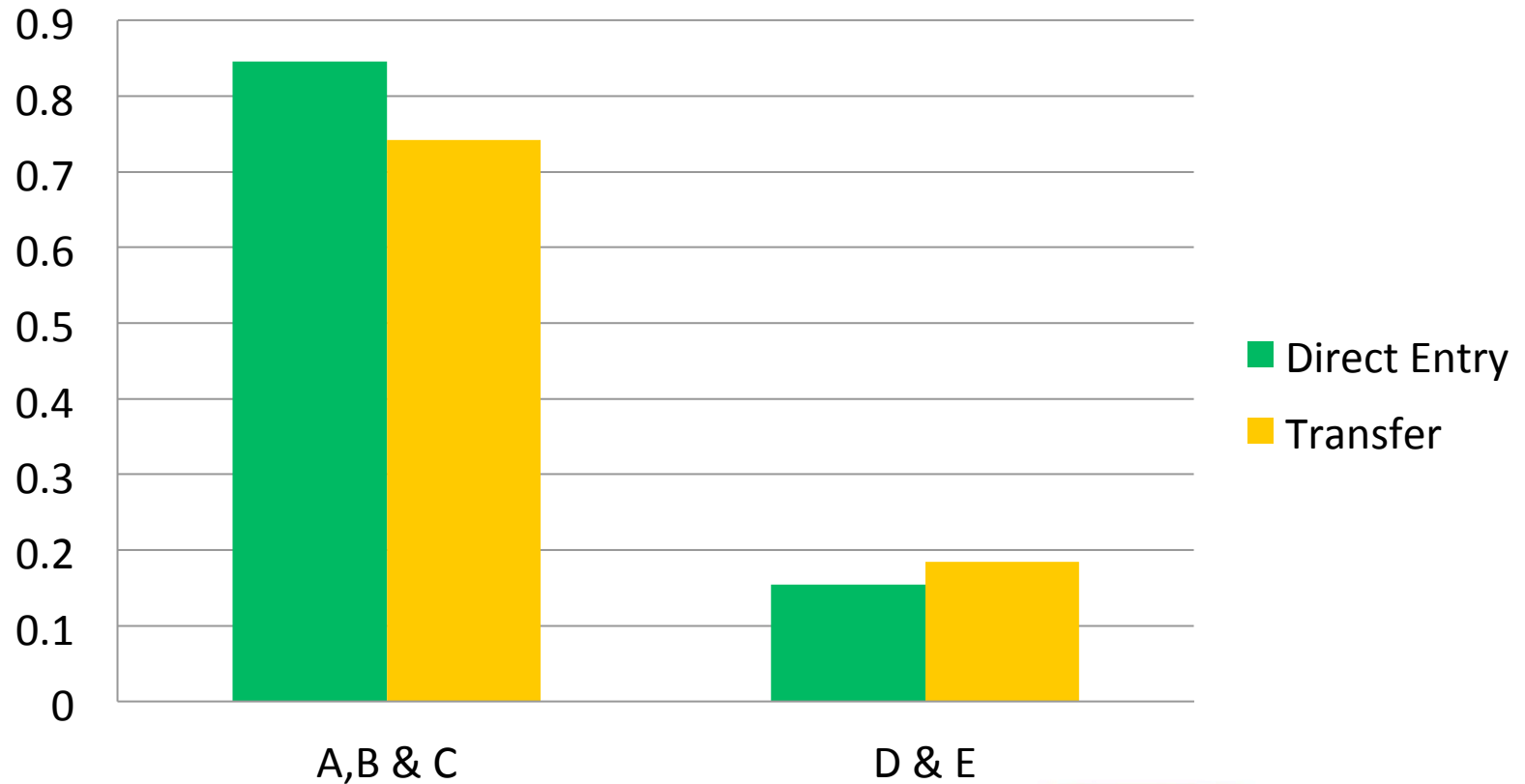
All Students

854 direct entry (70%) 362 transfer (30%)



All Students

793 direct entry (71%) 329 transfer (29%)



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All Courses

College Entry Type	Grades				Total
	A, B, & C		D & E		
Direct Entry	671	84.6%	122	15.4%	793
Transfers	244	74.2%	85	25.8%	329
Total	915	81.6%	207	18.4%	1122

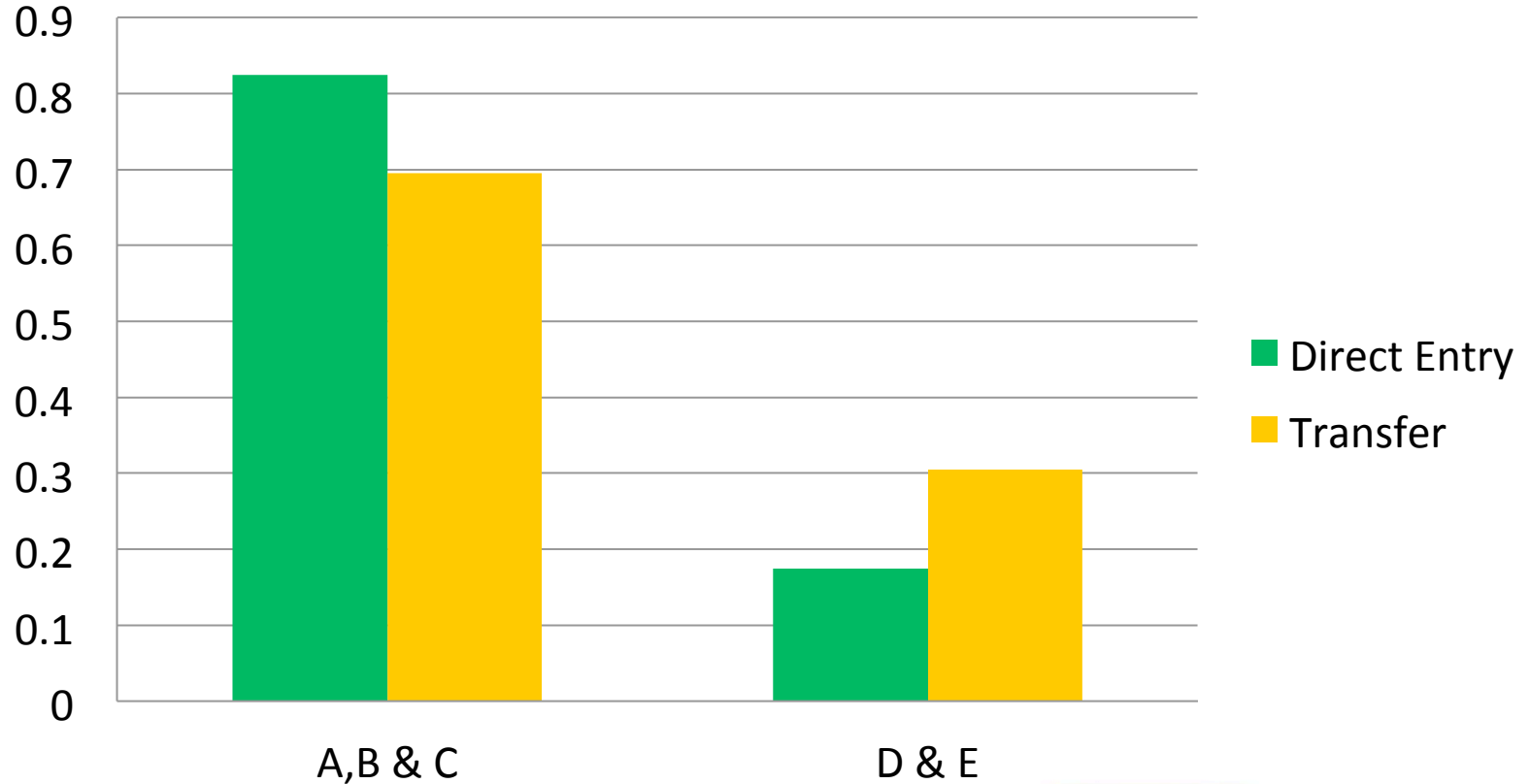
$\chi^2 (1, N = 1,122) = 16.88, p < .01$



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Lower Division

651 direct entry (73%) 246 transfer (27%)



Lower Division

College Entry Type	Grades				Total
	A, B, & C		D & E		
Direct Entry	538	82.6%	113	17.4%	651
Transfers	171	69.5%	75	30.5%	246
Total	709	79.0%	188	21.0%	897

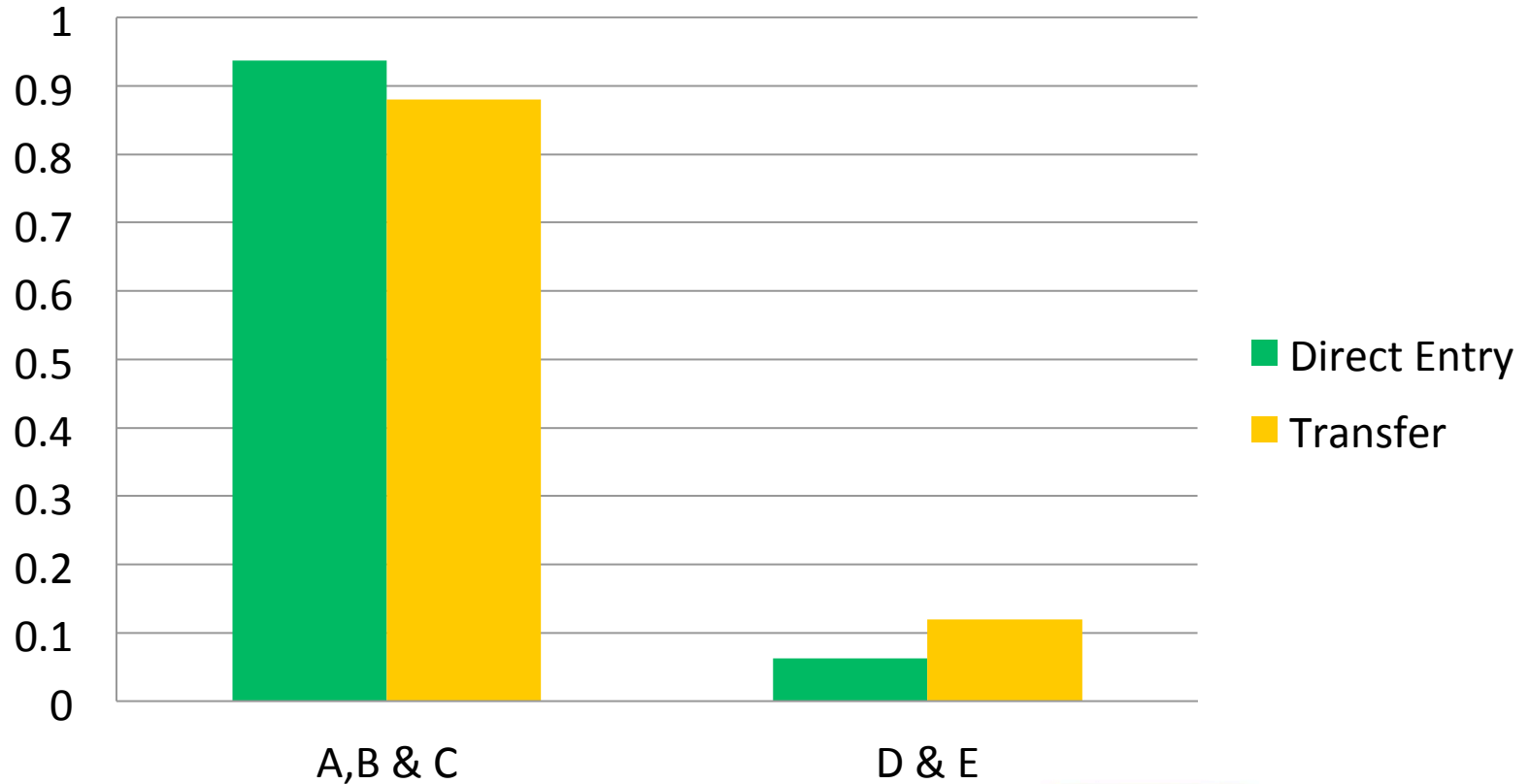
$\chi^2 (1, N = 897) = 18.58, p < .01$



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Upper Division Courses

142 direct entry (63%) 83 transfer (37%)



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Upper Division Courses

College Entry Type	Grades				Total
	A, B, & C		D & E		
Direct Entry	133	93.7%	9	6.3%	142
Transfers	73	88.0%	10	12.0%	83
Total	206	88.8%	19	8.4%	225

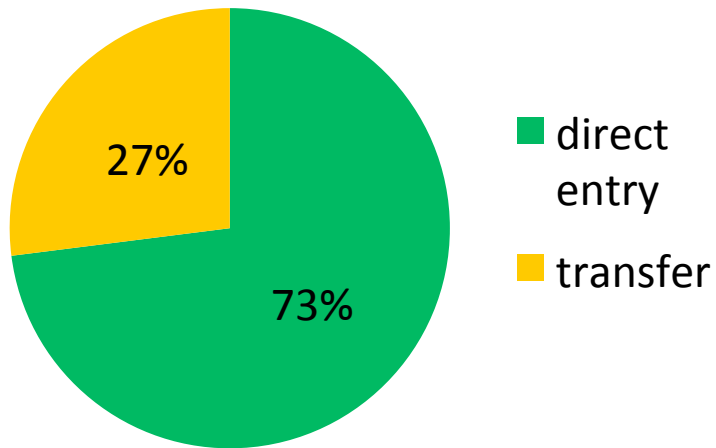
$\chi^2 (1, N = 225) = 2.21, p > .05$



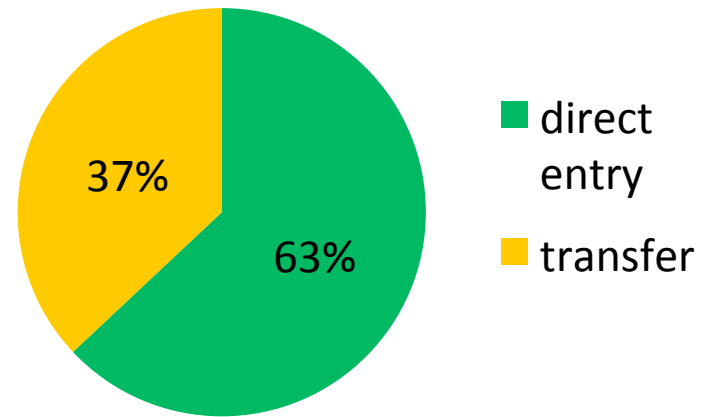
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Explanations?

Lower Division



Upper Division



How does the “weeding out” process unfold?



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Are transfer students initially choosing specific majors for all of the wrong reasons?



Are transfers more persistent?



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Your theories...



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Stay tuned!

A regression analysis will be conducted to examine how other factors (demographics, high school average, standardized test scores, feeder institutions, etc,) besides entry type contribute to the difference in course performance of these students.



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Now what?

- Information sharing
 - Faculty: to share or not to share?
 - Feeder Institutions
- Examine preparatory courses
 - Faculty to faculty meetings
 - Shared faculty



Thank You!



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