The Departmental Examination

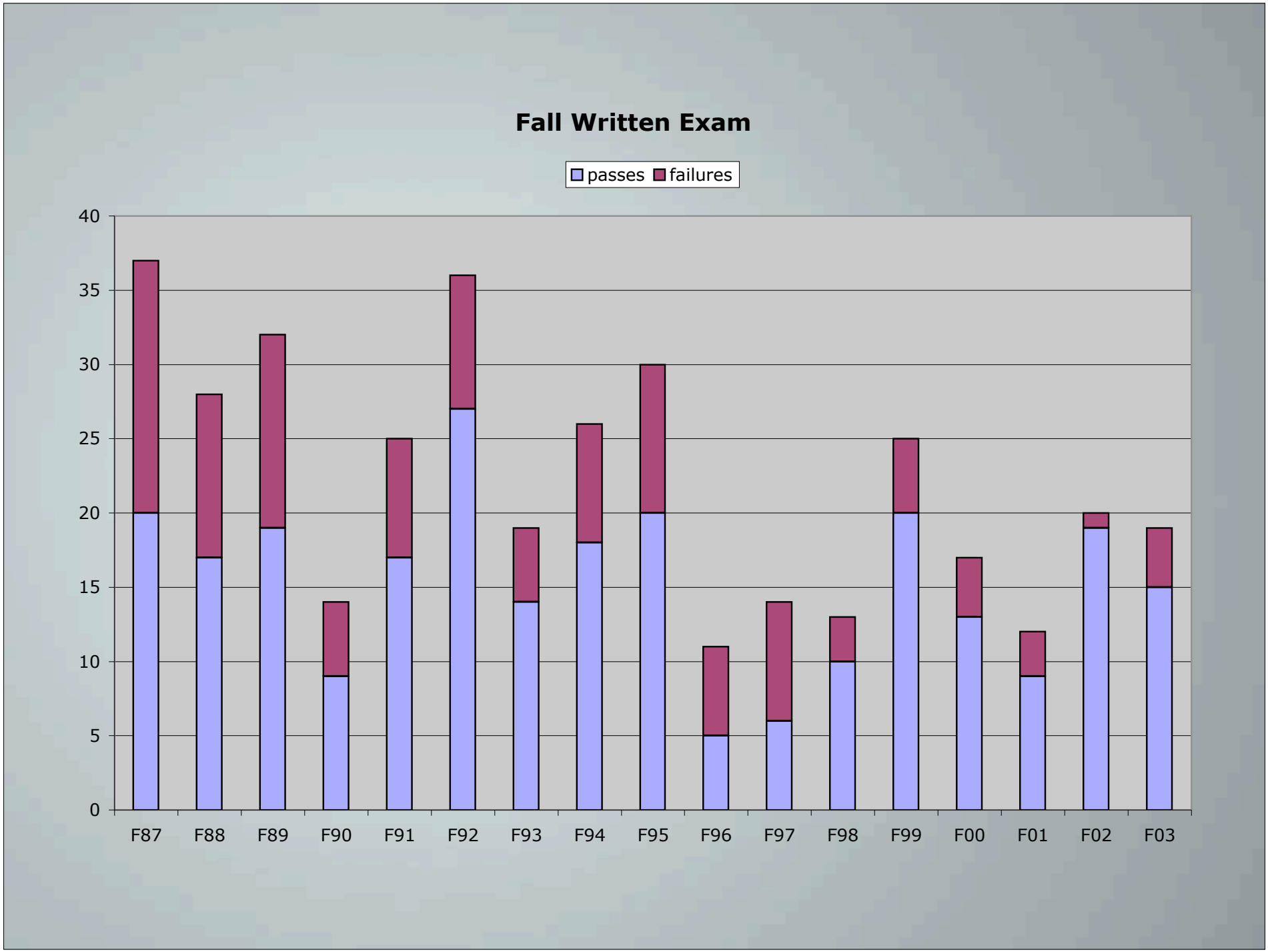
~ Comprehensive examination in undergraduate and beginning graduate level Physics.

~ Purpose of exam continuously debated by faculty. Basic idea: certify that student is prepared.

~ Chances for success are very high:

- average pass rate on written exam up to 80%
- 29 students left program over 30 year period due to exam
- data suggest exams are getting easier

~ Students who have trouble usually are poorly prepared. Best preparation is problem-solving.


Fall Written Exam
passes
failures
40
35
30
25
20
15
10
5
0
F87
F88
F89
F90
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F93
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F01
F02
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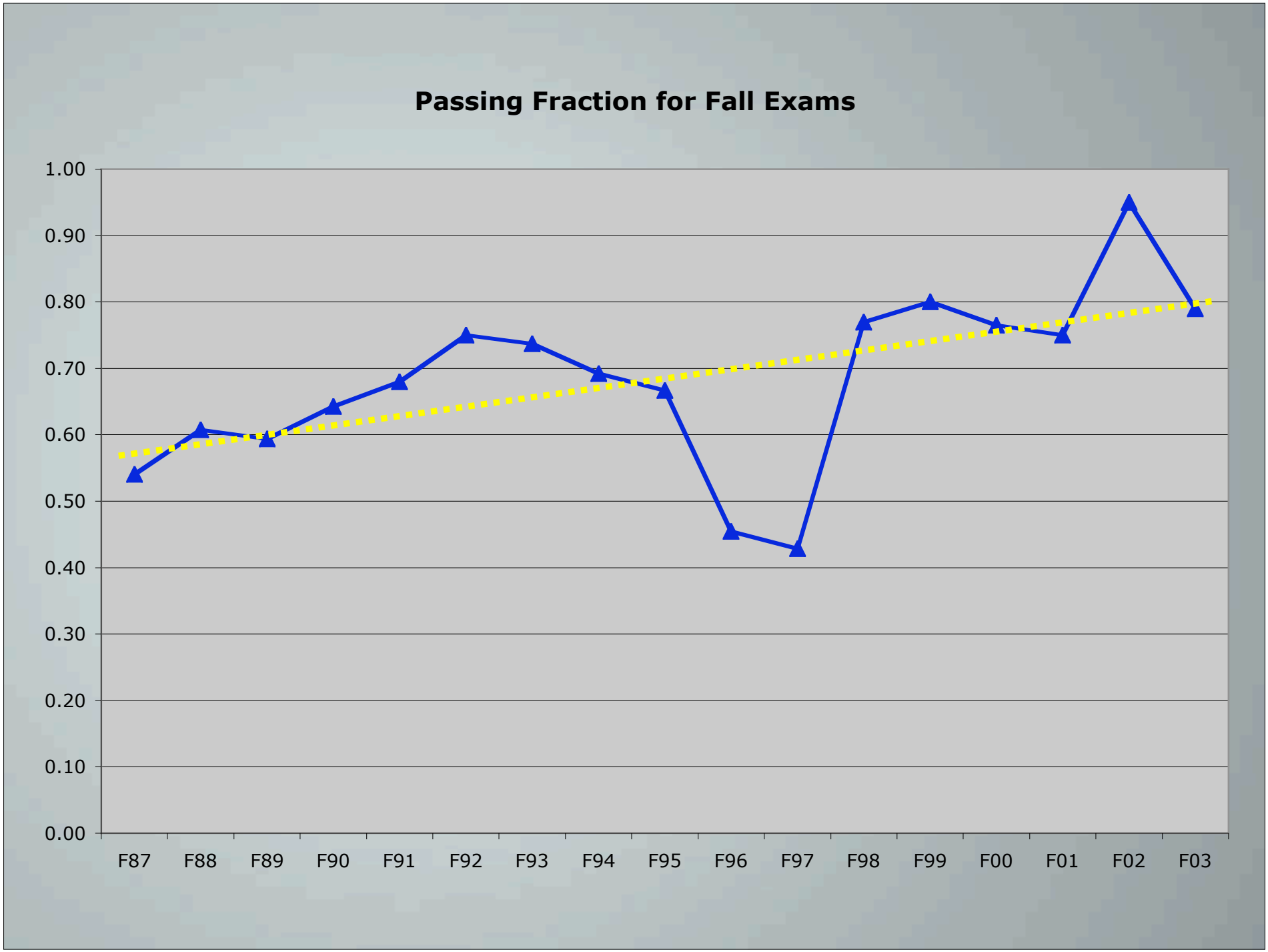
Passing Fraction for Fall Exams
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
F87
F88
F89
F90
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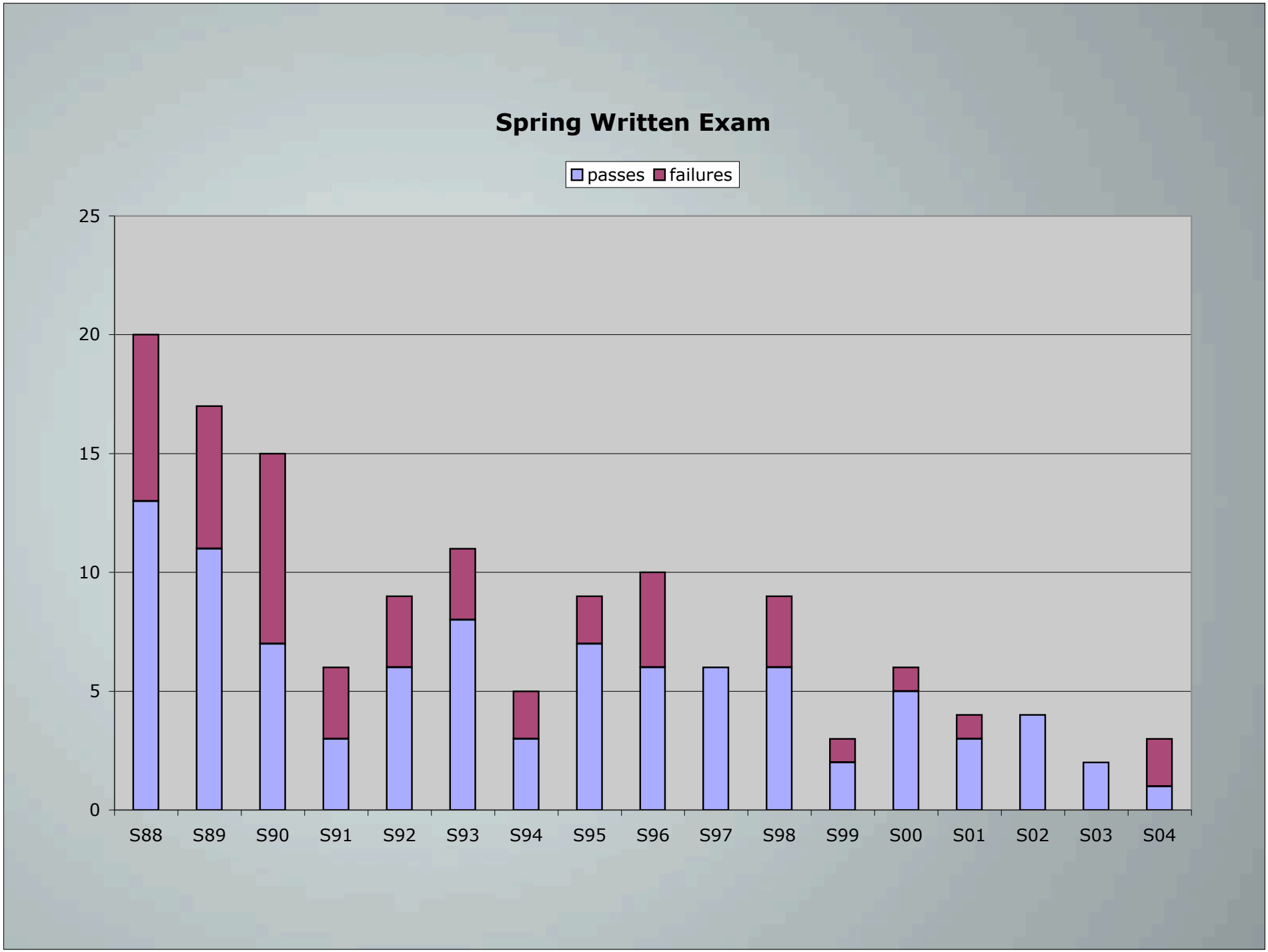
Spring Written Exam
passes
failures
25
20
15
10
5
0
S88
S89
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S91
S92
S93
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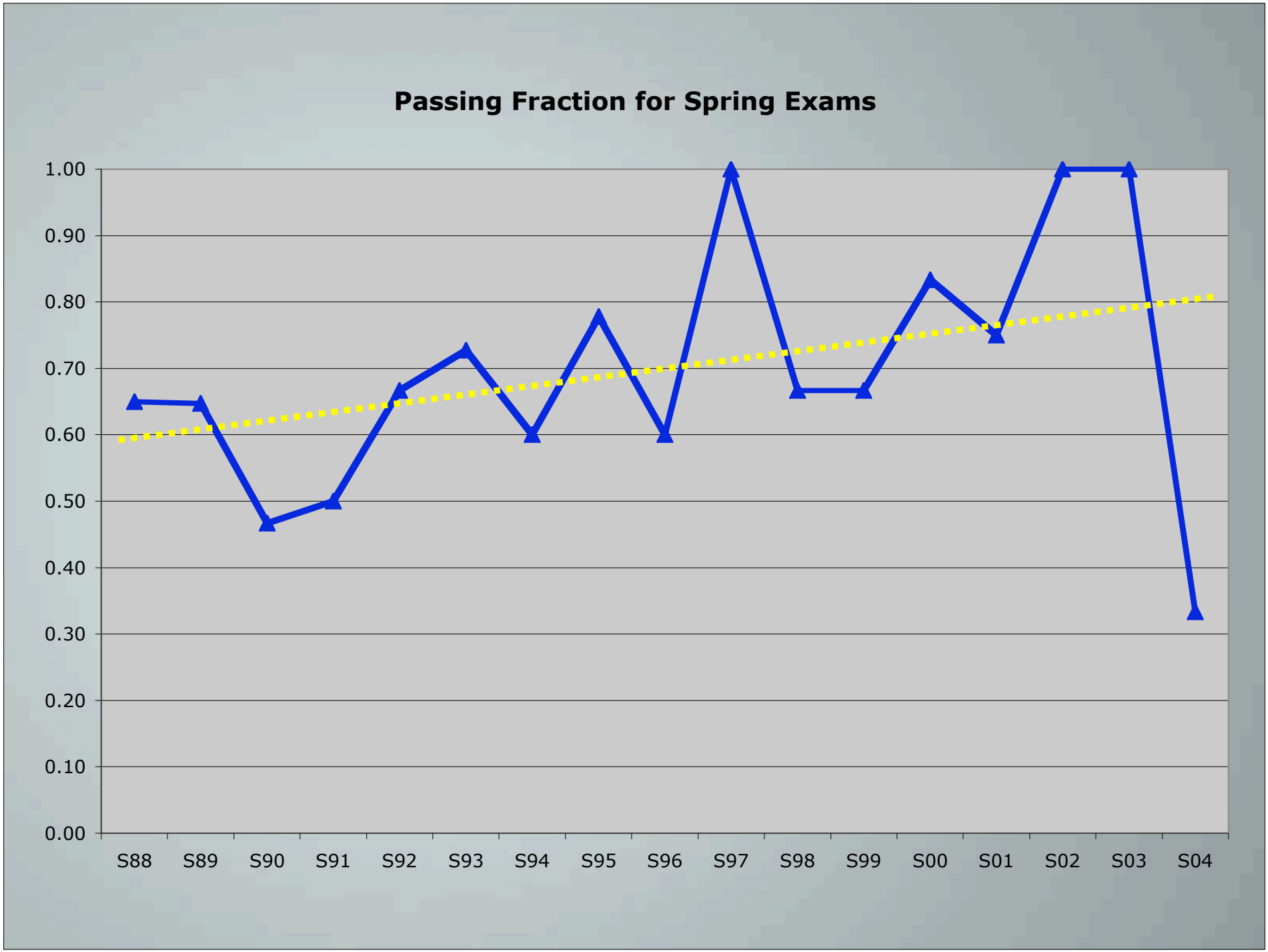
S95
S96
S97
S98
S99
S00
S01
S02
S03
S04


Passing Fraction for Spring Exams
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
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S88
S89
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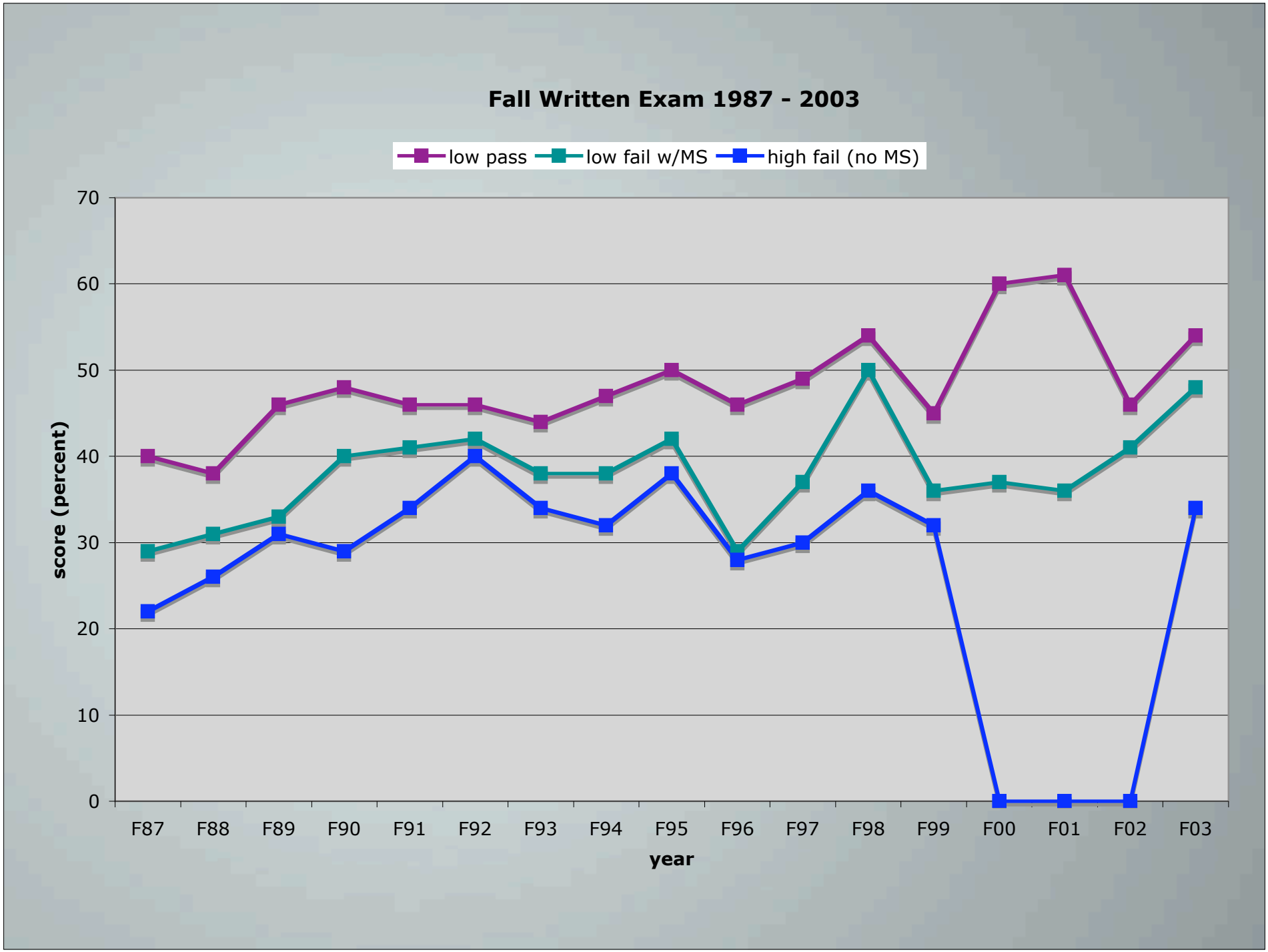
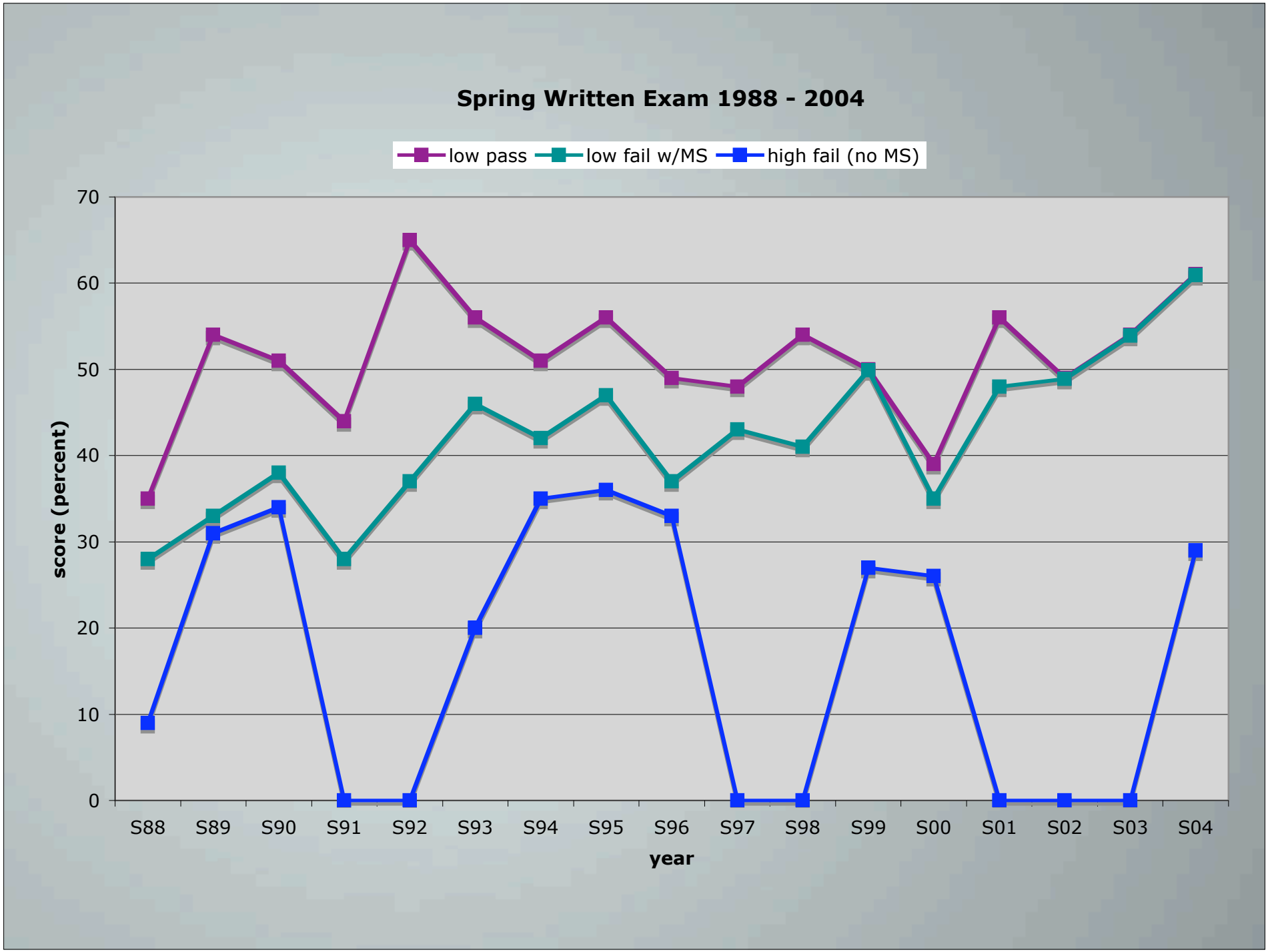
S04


Fall Written Exam 1987 - 2003
low pass
low fail w/MS
high fail (no MS)
score (percent)
70
60
50
40
30
20
10
0
F87
F88
F89
F90
F91
F92
F93
F94
F95
F96
F97
F98
F99
F00
F01
F02
F03
year


Spring Written Exam 1988 - 2004
low pass
low fail w/MS
high fail (no MS)
score (percent)
70
60
50
40
30
20
10
0
S88
S89
S90
S91
S92
S93
S94
S95
S96
S97
S98
S99
S00
S01
S02
S03
S04
year

Departmental Examination Policies

1. All graduate students must take a comprehensive Departmental Examination consisting of a written and (if necessary) oral components. The exam is usually taken in the Fall of year two.

   ~ Biophysics students may defer the written exam to the Fall of year 3.

   ~ Students with deficient Physics backgrounds, or students who have taken extensive time off prior to entering the Ph.D. program may be offered the option of deferring the written exam to the Fall of year 3.

2. The main purpose of the exam is to certify that the student's preparation is sufficient for him or her to begin research.

3. The written exam is divided into two parts, given over a two day period, for four hours each day.

   Part I: predominantly undergraduate level (upper division)

   Part II: predominantly graduate level (first year courses)

   Part II material is *usually*, but not *necessarily*, covered in the standard first year graduate curriculum (200AB, 201, 203AB, 212ABC, 210A).

Departmental Examination Policies

(continued)

4. There is no formal policy as to the composition of the written exam. However, recent exams generally have obeyed the following:

    a) 2 problems each day classical mechanics
    b) 2 problems each day classical electromagnetism
    c) 2 problems each day quantum mechanics
    d) 2 problems each day statistical mechanics / thermodynamics
    e) 2 problems each day other (mathematical physics, estimates, "experimental")

    Choose 7 of 10 problems each day, with at least one per section.

5. The written exam is offered twice each year (Fall and Spring).

6. Entering students get a "free shot" at passing the exam.

Departmental Examination Policies

(continued)

7. The written exam is prepared by the Exam Committee:
    a) standing committee with staggered membership for continuity
    b) membership of committee shall be known to students
    c) recent suggestion: expand committee, include first year instructors
    d) F04 committee not yet constituted

   Problems and solutions are solicited from the faculty at large.
   The Committee assigns a (secret) faculty grader to each problem.
   Each problem has the same weight.

8. Students are identified by code numbers - graders and Exam Committee members do not know the identity of the students until the pass/fail lines are set.

9. Graded exams, with solutions, are returned to students.
   Re-grade requests processed by the Student Affairs Office.

Departmental Examination Policies

(continued)

10. Total written exam score = mean of percentages for parts I and II. Histograms for parts I, II, and total provided after re-grades.

11. For continuing students, the Committee decides on the lowest passing score. This is the pass/fail line ("first line"). Students who pass are eligible for a M.S. and to continue in the Ph.D. program.

12. Entering students must separately pass parts I and II with a score at least as high as that set by the first line.

13. The Committee sets the "second line," which is suggested to be at 67% to 75% of the level of the first line. All students who score above the second line are eligible for a M.S. degree.

Departmental Examination Policies

(continued)

14. Continuing students who fail the exam on their first attempt must retake it the next time it is offered to continue. If they fail the second time but score between the two lines on either attempt, they are eligible to take an Oral Exam, administered by the Exam Committee.

15. The Oral Exam will cover deficiencies based on (i) results of the Written Exam, and (ii) other evidence in the academic record. The Committee may take into account the student's current or intended research area, input from research advisor, academic advisor, course instructors, et al.

16. Three possible outcomes from Oral Exam:

    (i) pass Departmental Examination
    (ii) fail Departmental Examination
    (iii) conditional pass (contingent on remedial action)

Departmental Examination Policies

(continued)

17. A student who fails the overall exam (including both attempts) must leave the program by the end of the current quarter.

18. Students who fail and score below the second line on both attempts will have their record reviewed at a faculty meeting to determine if they are eligible for the M.S. degree.

19. Requests for exceptions go to Vice Chair for Education.

Suggested strategies for preparation

1. Start planning your exam preparation schedule as soon as possible. Exam preparation requires dedicated time. Clear your calendars!

2. The best predictor of what may appear on a given written exam is the content of previous exams.

3. We will be offering an exam preparation "course" in early July or early August, to run for 6 to 8 weeks. Details forthcoming.

4. There is no substitute for problem solving in preparing for the exam.

5. A phased approach may be useful:

    a) review of first year courses (notes, exams, problem sets, etc.)
    b) focus on your own deficiencies, but work with your fellow students
    c) try practice problems from previous exams
    d) in final stages of preparation, reproduce exam conditions (time limit, no access to books/notes) and take a previous exam

Previous Exams and Solutions

~ 16 complete sets available online (F96 - S04)

~ To obtain pdf files of problems and solutions:

1. Go to http://reserves.ucsd.edu/
2. Select department: Physics
3. Click on Physics 200+ (exam solutions)

~ Some problems may be ill-posed!
Some solutions may be wrong!
Caveat emptor!