Transition from High School to University - 2005 Academic Year

Introduction

This report summarizes student performance in first year UBC physics courses, offered during the first term (September-December 2005), and relates UBC grades to high school grades. The study includes only students who graduated from Canadian high schools in 2005. Students must also have Physics 12 or Physics 11 requirements fulfilled. As a result, the sample used in this study represents about 62% of the total number of students enrolled in UBC first year physics courses in the Fall of 2005. This sample is useful for studying the transition from high school to university.

Following the initiative started by the UBC Mathematics Department (First Year Calculus Results), the report will compare students' participation and performance in UBC Physics courses by region, school and gender. Since the largest proportion of students graduated from B.C. high schools (93.4%), findings are significant at the provincial level. The 2005 high school graduates from Alberta (3.0%) and Ontario (2.6%) enrolled in UBC first year physics courses are also included in the comparative analysis. About 1% of students who graduated from other provinces across Canada are not included in the analysis. This is the sixth school-by-school report on performance in first year physics courses. We also include comparisons with 2004. The differences in average student performance from different schools are in most cases rather small. From experience with the Math and previous Physics reports we expect significant year to year variations in ranking.

Summary

- This report provides information on the distribution of grades in first year physics courses at UBC. In 2005 the average grades in first year physics were 12%-17% lower than the corresponding high school grades, depending on the first year course, with the highest average grades and the largest percentage of A's in PHYS 107.

- As in previous years this year's data shows significant year to year variations in the ranking of individual schools.

- This year three Richmond schools - Richmond Secondary, Robert McMath, Hugh McRoberts - took the top three places among suburban Vancouver schools. Richmond Secondary has been in the top five places for the last three years, and Robert McMath has been in the top half for the last three years. Seaquam has moved up the most on the list from 15th position last year to fourth this year.

- Among the Vancouver schools Templeton took the top spot for the first time followed by David Thompson and Gladstone. Among other top ranked schools Killarney which was ranked fourth has been in the top half for the last three years and University Hill which ranked 5th has been in the top half for the last two years.

- Richmond took the top position in the regional ranking followed by Vancouver East. Vancouver East has been in the top one or two places for four of the last six years. Richmond and Vancouver West have been in the top five for the past 6 years, and Burnaby has been in the top five for four of the last six years. North Van has been among the top four for three of the last six years.

- The private and catholic schools were in the bottom half of the ranking.

First Year UBC Physics courses (Term I)

A. ***UBC Physics courses with Mathematics 12 & Physics 12 requirements.***

PHYSICS 101: Energy and Waves (combined lecture/lab course).
PHYSICS 107: Physics I (honours level course)
PHYSICS 109: Introductory to Experimental Physics (lab course).
PHYSICS 153: Elements of Physics (this is a two-term course; only first term results are included in the analysis; the first term is a lecture course only)

NOTE: Since PHYS 107&109 are derived from PHYS 121, an Honours course that was offered in the past, data for these two courses will be combined. Results can be compared to previous years' results on PHYS 121 (2000-2001) or PHYS 107&109 (2002-2003). Most students (84%) enrolled in both PHYS 107 & 109 and in this case, their average grades are included in analysis. PHYS 107 grades are considered for students who enrolled only in the lecture course, while there are no students who enrolled only in PHYS 109.

B. ***UBC Physics course with Mathematics 12 & Physics 11 requirements***.

PHYSICS 100: Introductory Physics.

Enrolment and performance in UBC First Year Physics courses (Term I)

(includes students from the 2005 graduating classes of Canadian high schools with Physics 12 or Physics 11 requirement provided, only)

- **Table IA** compares performance for each course based on high school Physics 12. For each course, the average Physics 12 and UBC course grades are given.
- **Table IB** shows performance in PHYS 100. Physics 11 and PHYS 100 average grades are given.
- **Graph IA-B** shows the distribution of grades in all UBC vs. high-school physics courses.

Table IA Overall Performance - courses with Physics 12 requirement (2004 results in brackets)

UBC Physics Course	Number of students	Percentage passing	Percentage with A standing	Average school mark → Average UBC mark
101	535 (582)	93 (94)	38 (39)	86 → 74 (86 → 74)
107	46 (45)	94 (89)	59 (53)	93 → 77 (92 → 73)
153	449 (508)	90 (87)	32 (27)	88 → 71 (88 → 67)
ALL	**1030 (1135)**	**91 (90)**	**36 (34)**	**87 → 73 (87 → 71)**

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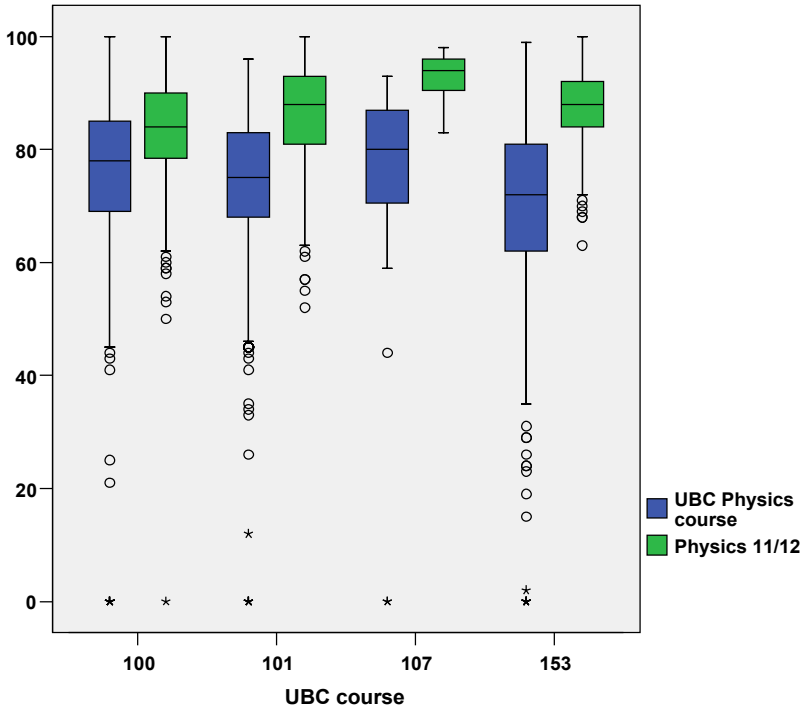
Table IB Overall Performance - Physics 11 requirement (2004 results in brackets)

UBC Physics Course	Number of students	Percentage passing	Percentage with A standing	Average school mark → Average UBC mark
100	341 (366)	89 (92)	47 (24)	83 → 76 (83 → 70)

Graph I A-B: Distribution of marks in UBC and high-school physics courses



Note: The clustered box plots offer summaries of values for separate variables. Each box contains 50% of cases and the line across the box indicates the median. The whiskers are lines that extend from the box to the highest and lowest values, excluding the outliers (cases with values between 1.5 and 3 box lengths from the upper or lower edge of the box) and extremes (values more than 3 box lengths from the box).

UBC Physics courses by gender

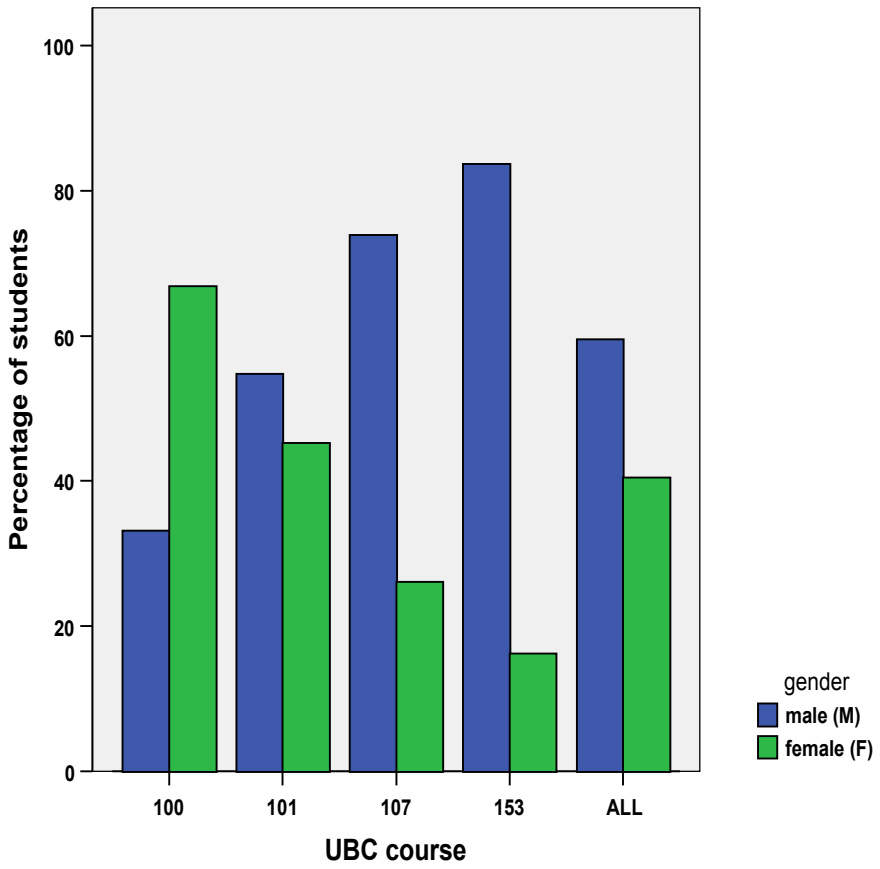
(includes students from the 2005 graduating classes of Canadian high schools with Physics12 or Physics11 grades provided)

Table IC Gender (2004 results in brackets)

UBC Physics Course	Gender	Number of students	Percentage passing	Percentage with A standing	Average school mark → Average UBC mark
100	male	113 (108)	89 (97)	55 (31)	81 → 77 (80 → 74)
	female	228 (258)	89 (90)	43 (21)	84 → 75 (83 → 68)
101	male	293 (304)	92 (94)	42 (43)	87 → 74 (86 → 75)
	female	242 (278)	93 (93)	34 (35)	86 → 73 (85 → 73)
107	male	34 (34)	91 (88)	53 (56)	93 → 76 (91 → 74)
	female [a]	12 (11)	100 (91)	75 (45)	94 → 80 (95 → 71)
153	male	376 (415)	89 (87)	32 (27)	88 → 71 (88 → 67)
	female	73 (93)	90 (84)	30 (28)	87 → 71 (87 → 65)

[a] Due to the small size of this group, results should be interpreted with caution.

Graph IC: Gender representation in UBC physics courses



Note: There is no significant statistical difference between male and female students' performance in the Physics courses. However, gender is a factor that introduces a significant difference in course participation for PHYS 100 (ratio M:F about 1:2), PHYS 107 (ratio M:F about 3:1) and PHYS 153 (ratio M:F about 5:1).

Comparison by region and school type

(includes students from the 2005 graduating classes of BC high schools with Physics12 or Physics11 requirement)

Table II compares results by region and school type, cumulating data for courses with Physics 12 requirement, i. e. PHYS 101, PHYS 107/PHYS 109, PHYS 153, currently included in Group A. The B.C. schools identified by region are public schools. Private and Catholic schools from all over the province form two separate groups. Vancouver schools are grouped in Vancouver east and Vancouver west. Suburban Vancouver includes Burnaby, Langley, New Westminster, Maple Ridge, Surrey, Coquitlam, Delta, North Vancouver, West Vancouver, and Richmond school districts. Vancouver Island, B. C. Interior schools and students from other provinces are grouped separately. For comparison, Ontario and Alberta high school students are included in the ranking. Only regions with at least **25** students in UBC physics courses from Group A are "ranked".

Table II Region and School Type (2004 results in brackets)

School Type or Region ranking	Students in Group A courses	% Passing	% with A Standing	Avg. school mark → Avg. UBC mark	% stud in Group A courses
1. Richmond (4)	127 (137)	95 (93)	46 (39)	87 → 76 (87 → 73)	78 (77)

2. Vancouver east (2)	119 (126)	92 (92)	45 (36)	85 → 75 (85 → 77)	65 (73)
3. Burnaby (1)	85 (109)	92 (93)	41 (39)	85 → 74 (86 → 74)	73 (82)
4. North Vancouver (6)	36 (36)	97 (92)	33 (33)	87 → 74 (89 → 73)	67 (78)
5. Vancouver west (2)	110 (106)	91 (94)	40 (39)	88 → 73 (88 → 74)	75 (73)
6. Delta (7)	38 (46)	92 (93)	39 (28)	89 → 72 (90→ 71)	73 (78)
7. B. C. Interior (10)	58 (64)	90 (88)	33 (28)	88 → 71 (88 → 70)	76 (71)
7. Vancouver Is. (5)	30 (29)	87 (97)	37 (28)	90 → 73 (87 → 74)	75 (83)
9. Private (12)	52 (64)	88 (83)	31 (30)	88 → 72 (87 → 66)	85 (77)
9. Catholic (7)	32 (32)	88 (87)	31 (32)	87 → 71 (86 → 71)	63 (50)
12. West Vancouver	32	81	34	86 → 70	71
13. Surrey (9)	103 (88)	91 (86)	23 (32)	87 → 70 (87 → 70)	79 (75)
10. Coquitlam (10)	79 (106)	90 (88)	29 (28)	88 → 71 (88 → 70)	85 (79)
Alberta	35 (46)	100 (87)	51 (33)	NA→78 (NA→70)	85 (94)
Ontario	29 (28)	97 (100)	24 (43)	NA→71 (NA→74)	81 (64)

Ranking procedure

The ranking is based ONLY on students' participation in Group "A" courses (courses with Physics 12 requirement: PHYS 101, PHYS 107/PHYS 109, PHYS 153).

The ranking is determined by equally weighting ranks in the categories:

a) % passing in Group A courses

b) % with A standing (A-, A, A+) in these courses

c) the relative change of average grades in high school vs. UBC Physics courses.

High values of % passing, % with A standing, as well as small variation in grades would contribute to higher ranks. Regions or schools are first ranked in each category (a-c) and then a total rank is computed.

Tables also show the % of students in Group A courses vs. total number of students in UBC physics courses. These data are not considered in ranking, but provide additional information about students' course choice.

School-by-school results

The school-by-school Tables (III, IV, V) include ranking of schools with at least 10 students in UBC physics courses with Physics 12 requirement (PHYS 101, PHYS 107/PHYS 109, PHYS 153) in September 2004. Results are organized in three tables: Vancouver schools, Suburban Vancouver schools and B. C. schools outside Metropolitan Vancouver. Schools outside Metropolitan Vancouver (Table V) are not ranked, since the number of students was too small (results given in alphabetical order).

Ranking procedure

The ranking is based ONLY on students' participation in Group "A" courses (courses with Physics 12 requirement: PHYS 101, PHYS 107/PHYS 109, PHYS 153).

The ranking is determined by equally weighting ranks in the categories:

a) % passing in Group A courses

b) % with A standing (A-, A, A+) in these courses

c) the relative change of average grades in high school vs. UBC Physics courses.

High values of % passing, % with A standing, as well as small variation in grades would contribute to higher ranks. Regions or schools are first ranked in each category (a-c) and then a total rank is computed.

Tables also show the % of students in Group A courses vs. total number of students in UBC physics courses. These data are not considered in ranking, but provide additional information about students' course choice.

Table III Vancouver Schools (2004 results in brackets)

School Ranking	Students in Group A courses	% Passing	% with A Standing	Avg. school mark → Avg. UBC mark	% stud in Group A courses
1. Templeton	10	100	80	92 → 84	100
2. David Thompson (7)	18 (12)	100(100)	44 (25)	84 → 77 (88 → 75)	69 (80)
2. Gladstone (10)	11 (13)	100 (85)	45 (23)	87 → 79 (86 → 71)	73 (76)
4. Killarney (2)	27 (14)	89 (93)	52 (57)	85 → 76 (85 → 77)	79 (67)
5. University Hill (4)	18 (18)	94(100)	50 (39)	87 → 75 (88 → 77)	100 (86)
6. Lord Byng	17	100	47	90 → 77	81
7. Eric Hamber (5)	16 (21)	94 (90)	44 (52)	86 → 75 (86 → 75)	70 (64)
8. Winston Churchill (3)	22 (31)	91 (94)	32 (42)	84 → 70 (82 → 76)	49 (63)
8. Magee (9)	16 (16)	88 (94)	44 (25)	87 → 74 (85 → 69)	73 (84)
8. Point Grey (8)	11 (13)	91 (92)	36 (38)	87 → 73 (88 → 74)	65 (72)
11. Kitsilano	14	86	36	87 → 68	70
12. Prince of Wales (6)	16 (18)	88 (100)	19 (33)	89 → 68 (88 → 74)	67 (64)

Table IV Suburban Vancouver Schools (2004 results in brackets)

School Ranking	Students in Group A courses	% Passing	% with A Standing	Avg. school mark → Avg. UBC mark	% students in Group A courses
1. Richmond (2)	25 (35)	100(100)	72 (54)	85 → 82 (86 → 78)	86 (83)
1. Robert McMath (11)	11 (10)	100 (90)	73 (30)	92 → 84 (85 → 70)	79 (67)
3. Hugh McRoberts (7)	10 (14)	100(100)	50 (36)	89 → 78 (88 → 72)	63 (78)
4. Seaquam (15)	11 (14)	91 (86)	82 (36)	91 → 80 (88 → 68)	73 (82)
5. West Vancouver	15	93	47	87 → 77	75
6. Burnaby Central (1)	13 (16)	100(100)	38 (63)	85 → 73 (89→ 80)	59 (76)
7. Burnaby North (4)	21 (23)	90 (96)	43 (39)	87 → 74 (87 → 77)	81 (79)
7. Handsworth (10)	12 (11)	92 (100)	42 (18)	90 → 76 (87 → 73)	80 (92)
9. Charles London	16	100	38	90 → 75	70
10. R. C. Palmer (5)	13 (10)	92 (90)	23 (70)	76 → 72 (87 → 74)	100 (77)
10. Pinetree (19)	16 (13)	100 (85)	31 (25)	87 → 75 (87 → 67)	73 (65)
10. Semiahmoo Sr. (15)	25 (13)	92 (85)	36 (31)	87 → 74 (85 → 69)	96 (93)
13. Burnaby South (8)	29 (27)	86 (85)	34 (37)	83 → 73 (86 → 72)	88 (79)
14. Terry Fox Sr.	11	91	45	91 → 67	100
15. Delta (13)	12 (10)	100(100)	33 (30)	87 → 69 (92 → 72)	100 (91)
16. Steveston (21)	20 (11)	80 (82)	40 (18)	85 → 70 (90 → 67)	91 (73)
17. J. N. Burnett (13)	22 (27)	95 (93)	23 (30)	90 → 73 (90 → 73)	79 (90)
18. Centennial (18)	20 (19)	90 (84)	30 (32)	89 → 72 (90 → 72)	91 (83)

19. Elgin Park	11	100	9	87 → 68	79
20. Rockridge	12	83	33	87 → 65	80
21. Fraser Heights	14	86	21	88 → 68	100
22. Port Moody (11)	17 (34)	82 (91)	18 (29)	85 → 69 (87 → 72)	85 (83)

Table V Schools Outside Vancouver Area- (alphabetical order)

School	Students in Group A courses	% Passing	% with A Standing	Avg. school mark → Avg. UBC mark	% in Group A courses
BC Ministry of Education	20	80	25	85 → 65	77
Dover Bay Sec School	5	80	20	87 → 62	83
Woodlands Sec	5	80	40	90 → 79	83