

WOU Division of Natural Sciences and Mathematics:

**Synthesis of Enrollment Data and Student Credit-Hour Production
Academic Years 2002-2009**

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OVERVIEW AND CONTENTS

This document provides a compilation of enrollment trends and student credit hour production in the Division of Natural Sciences and Mathematics at Western Oregon University, covering the time period from 2002-2009. The data presented herein were derived from WOU Banner reports provided by the College of Liberal Arts and Sciences, the Office of Institutional Research, and the Business Office. Ancillary national high school science education data were provided by the Council of Chief State School Officers (CCSSO, 2007, “State Indicators of Science and Mathematics”) and the National Center for Education Statistics (NCES, 2007, “Digest of Education Statistics”). Special thanks are extended to Kathy Hill, Joe Sendelbaugh, Eric Borst, and Sally Duncan at WOU. Their assistance is greatly appreciated. The following is a list of figures and tables.

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**Figure 1. Natural Science and Mathematics
Total Student Credit Hour Production By Term
AY 2002-2009**

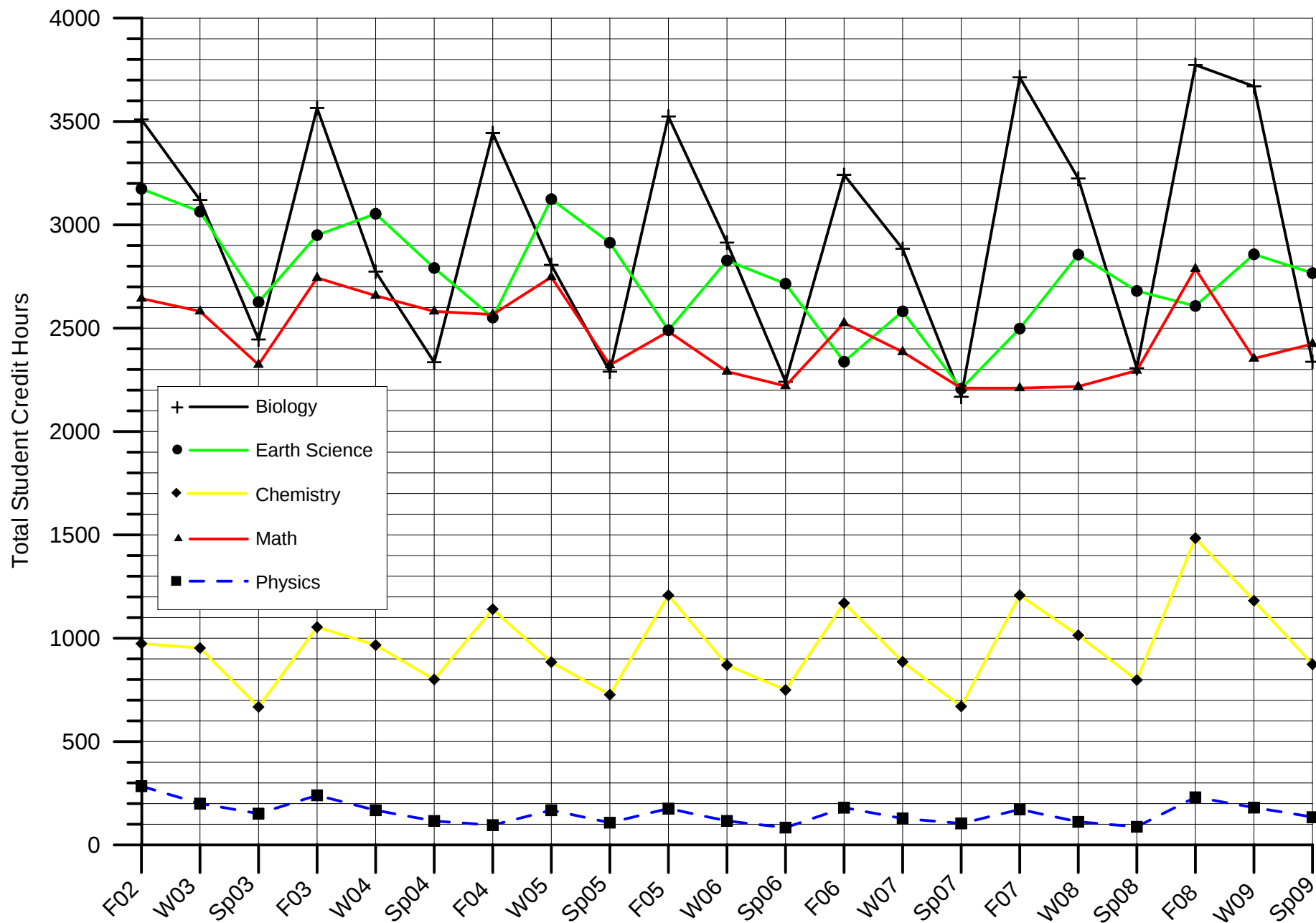


Figure 2. Natural Science and Mathematics
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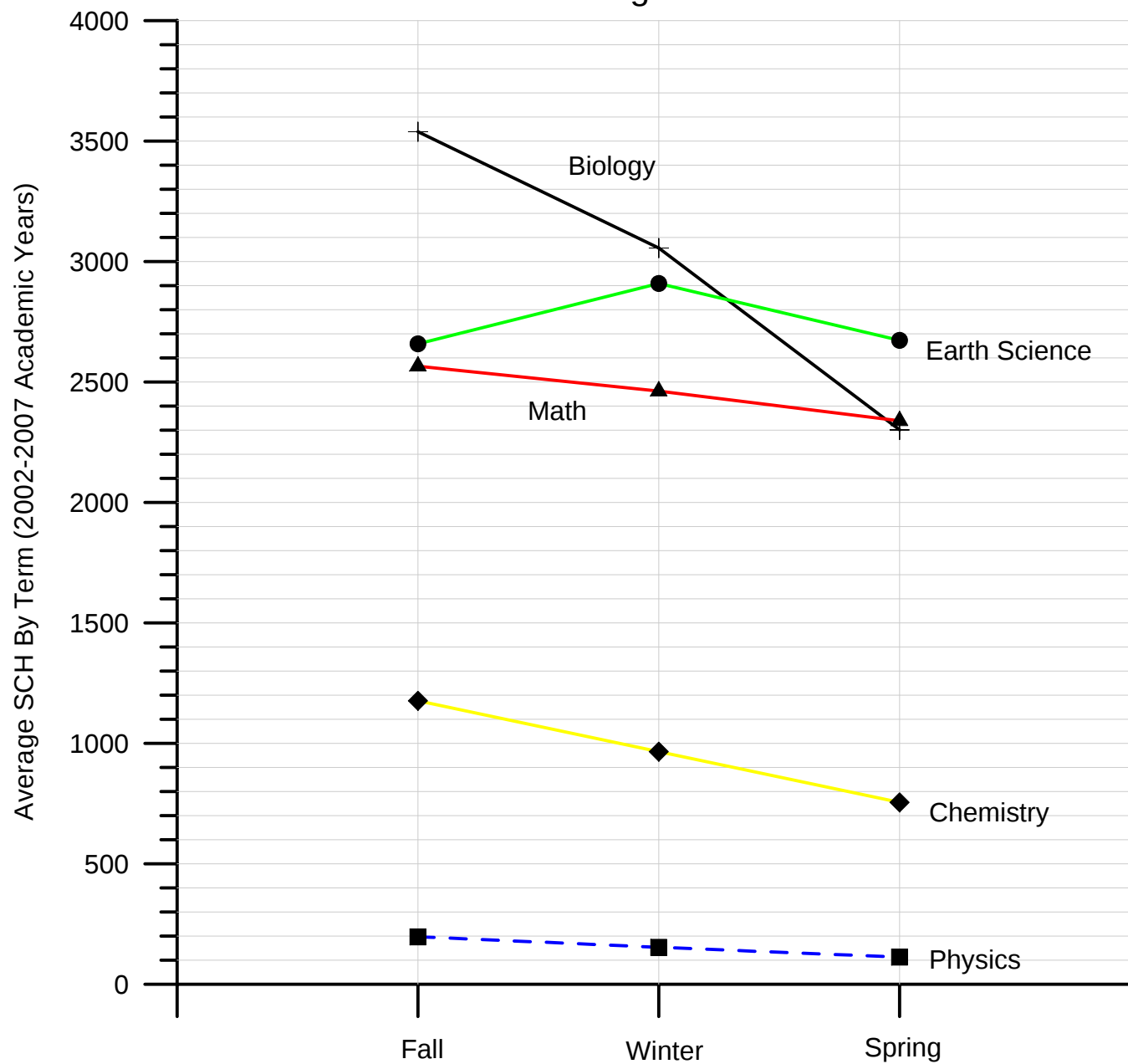
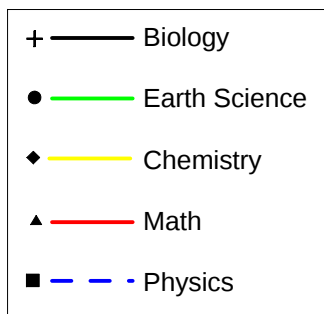
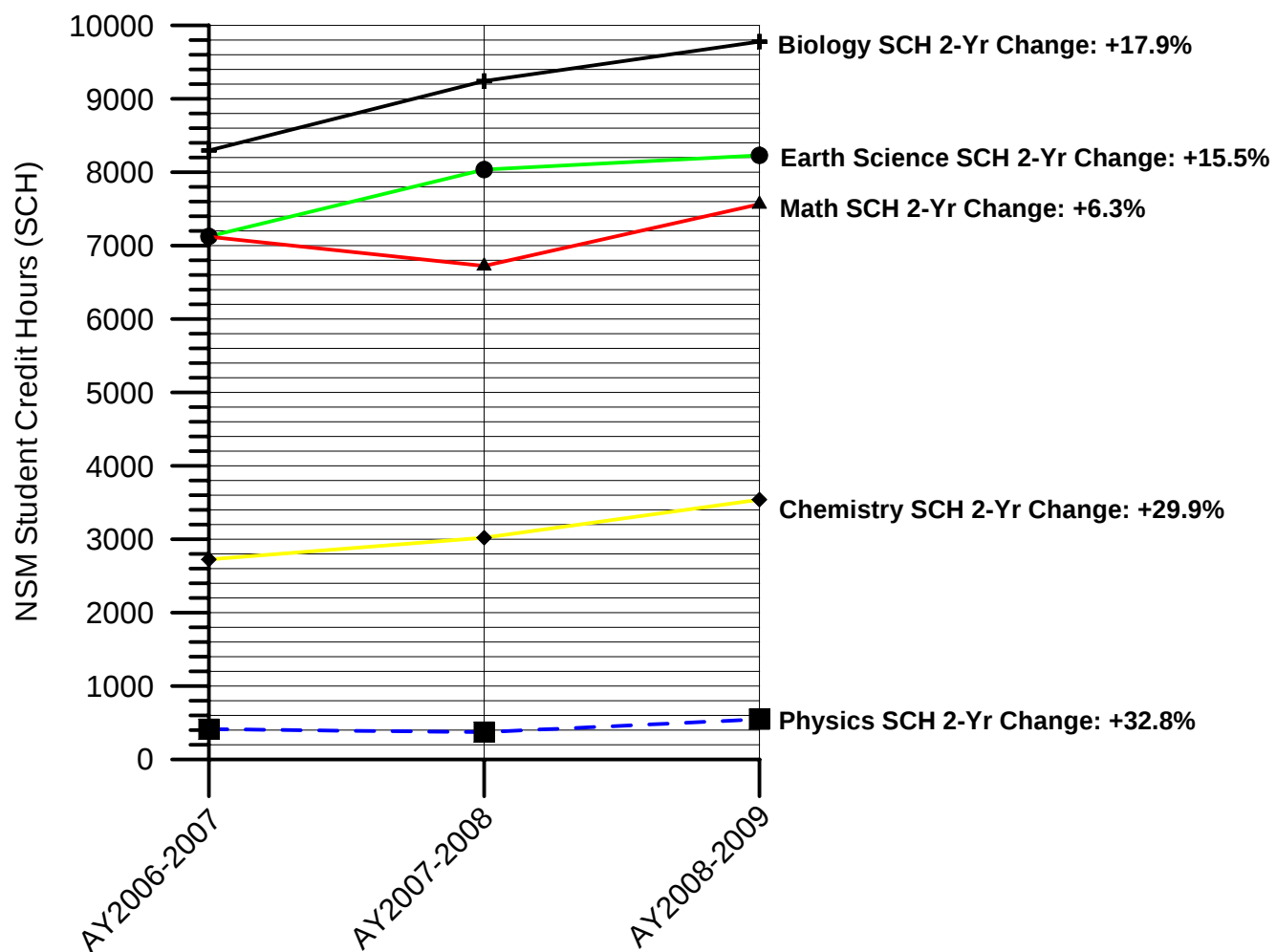


Figure 3. Natural Science and Mathematics Enrollment Trends
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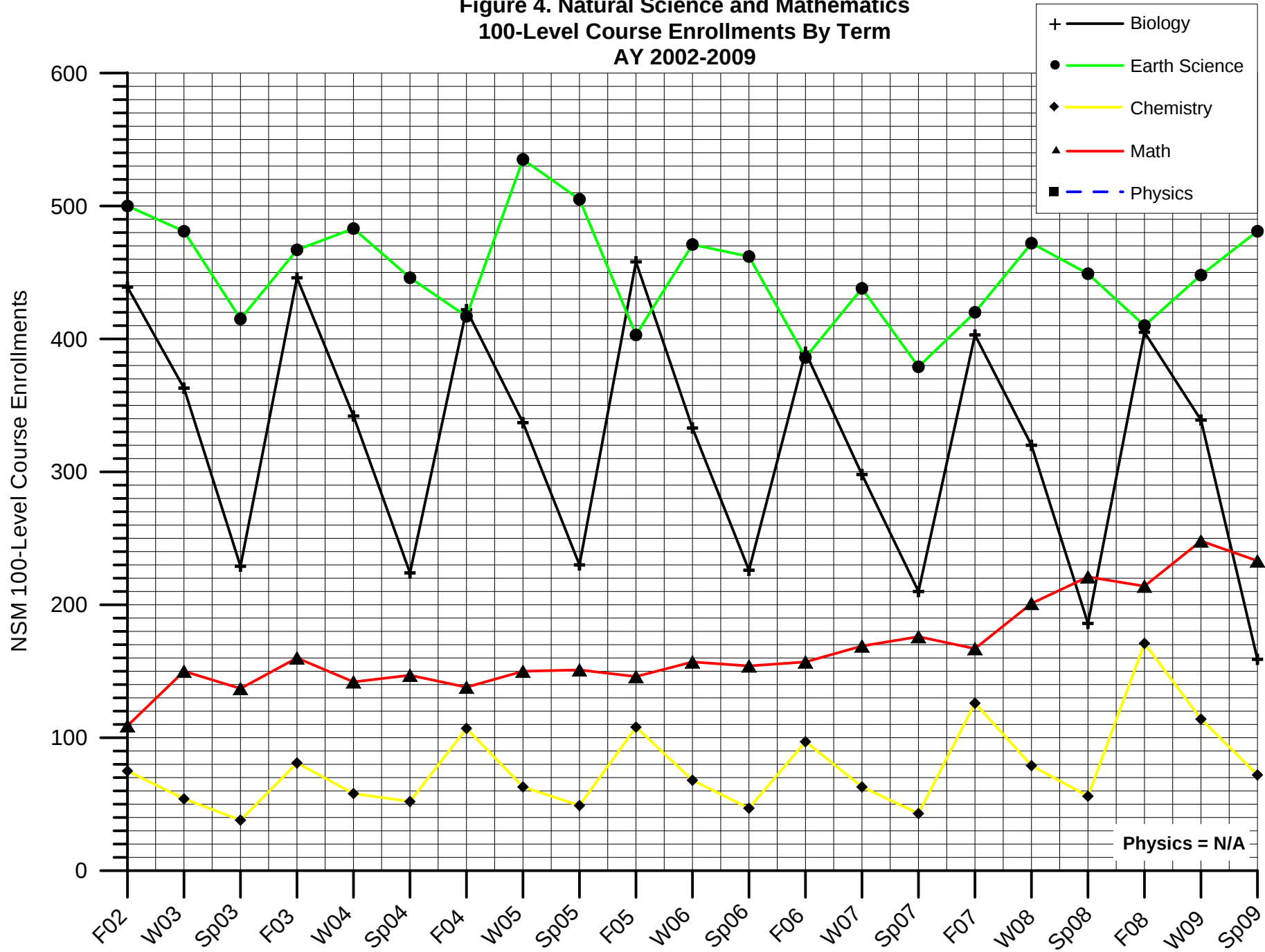


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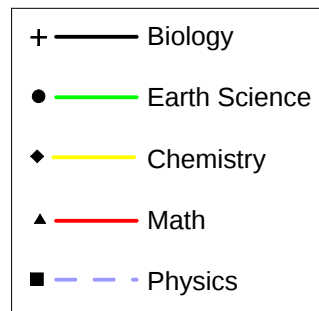


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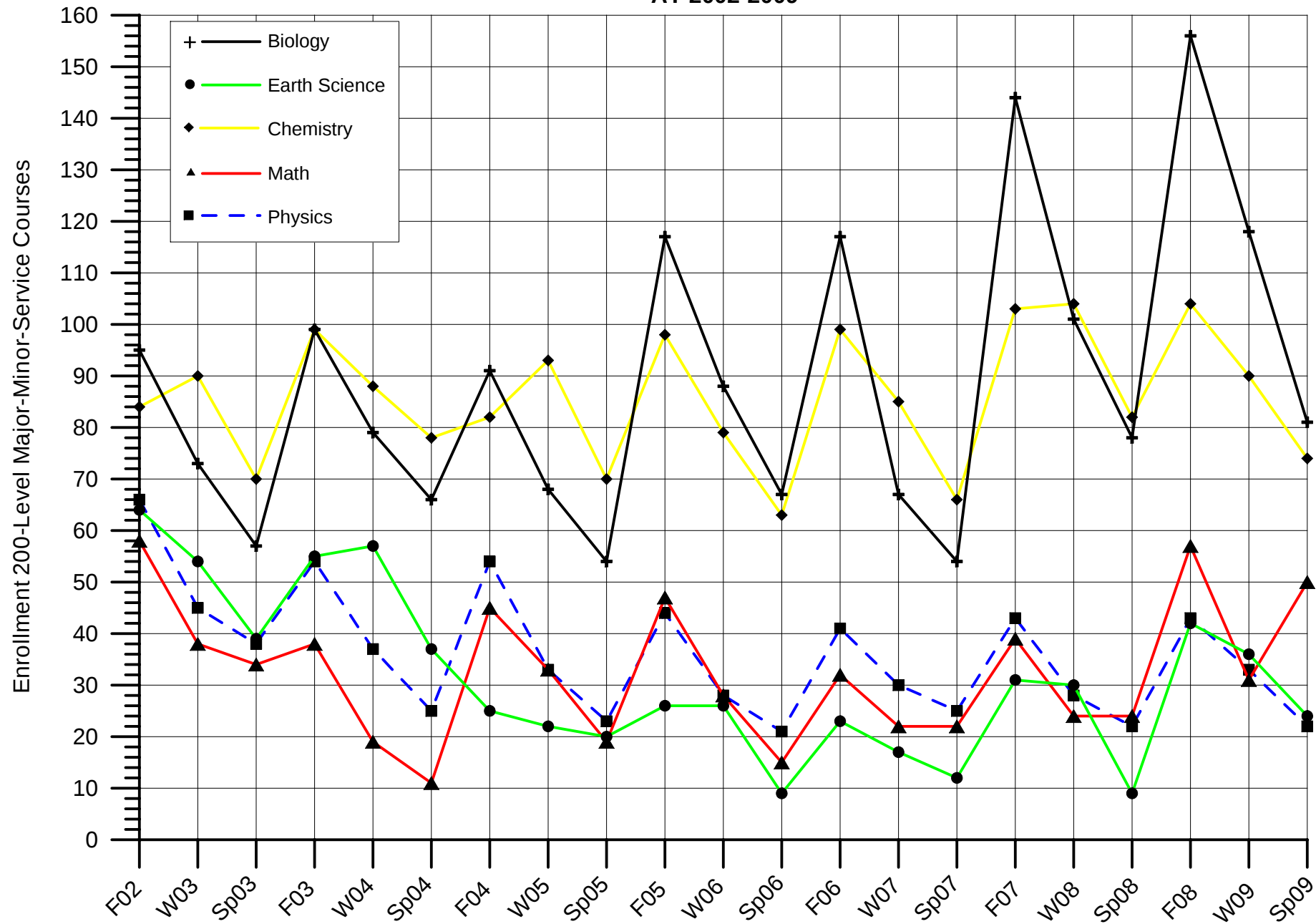


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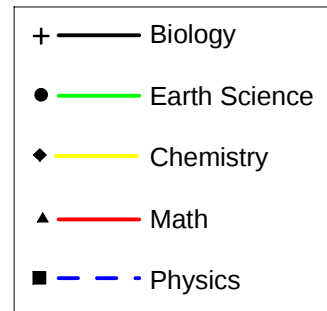
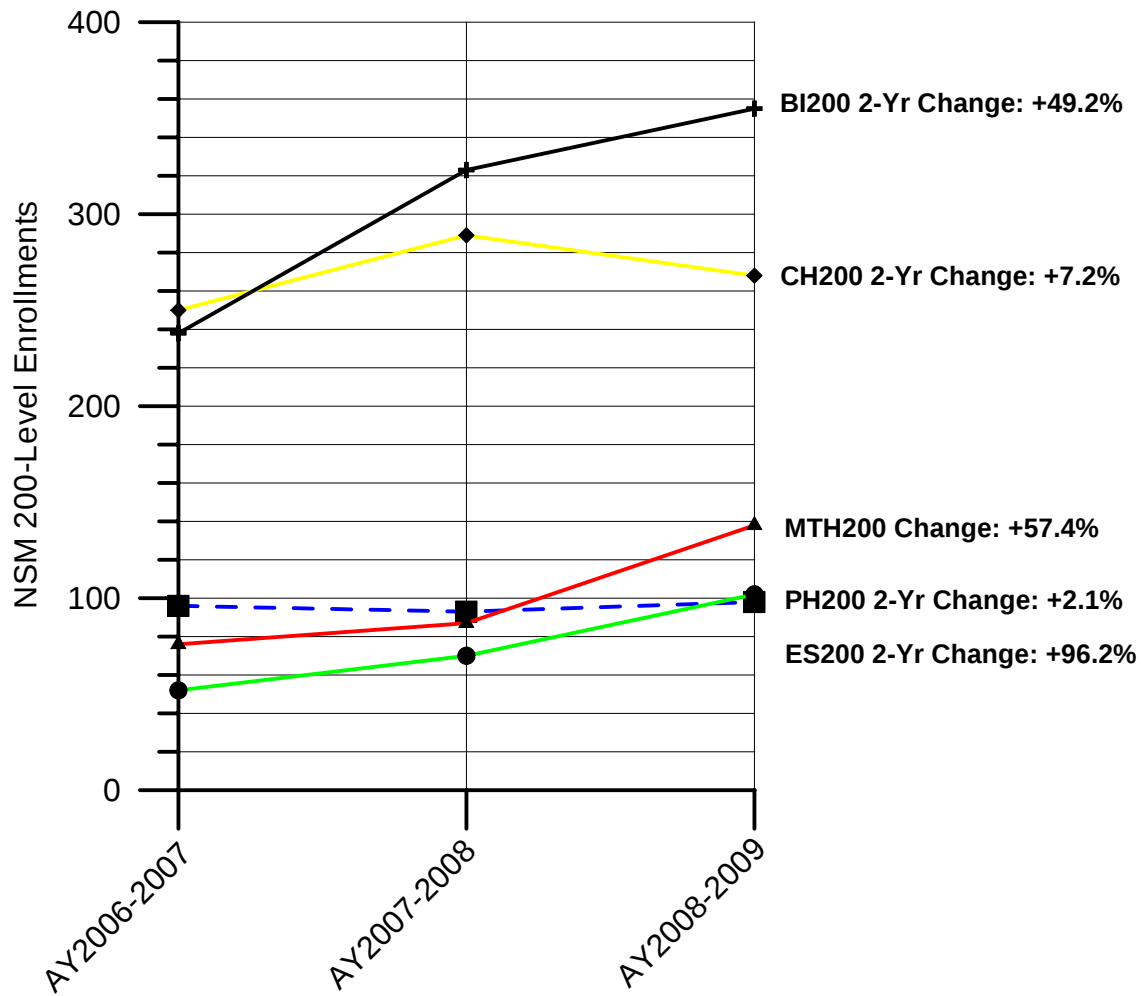
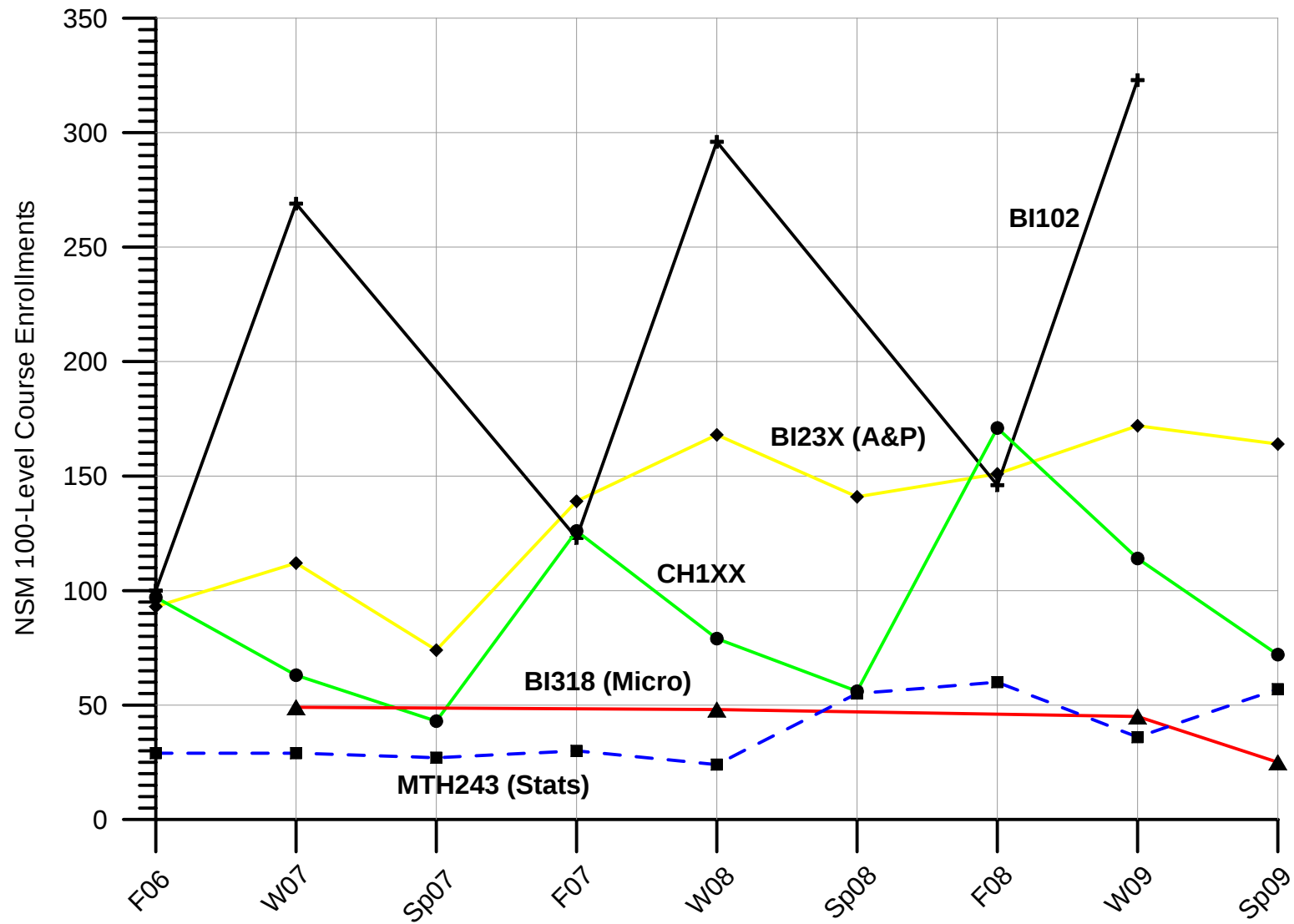


Figure 8. WOU NSM Pre-Nursing Course Enrollments By Term
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**Figure 9. Natural Science and Mathematics
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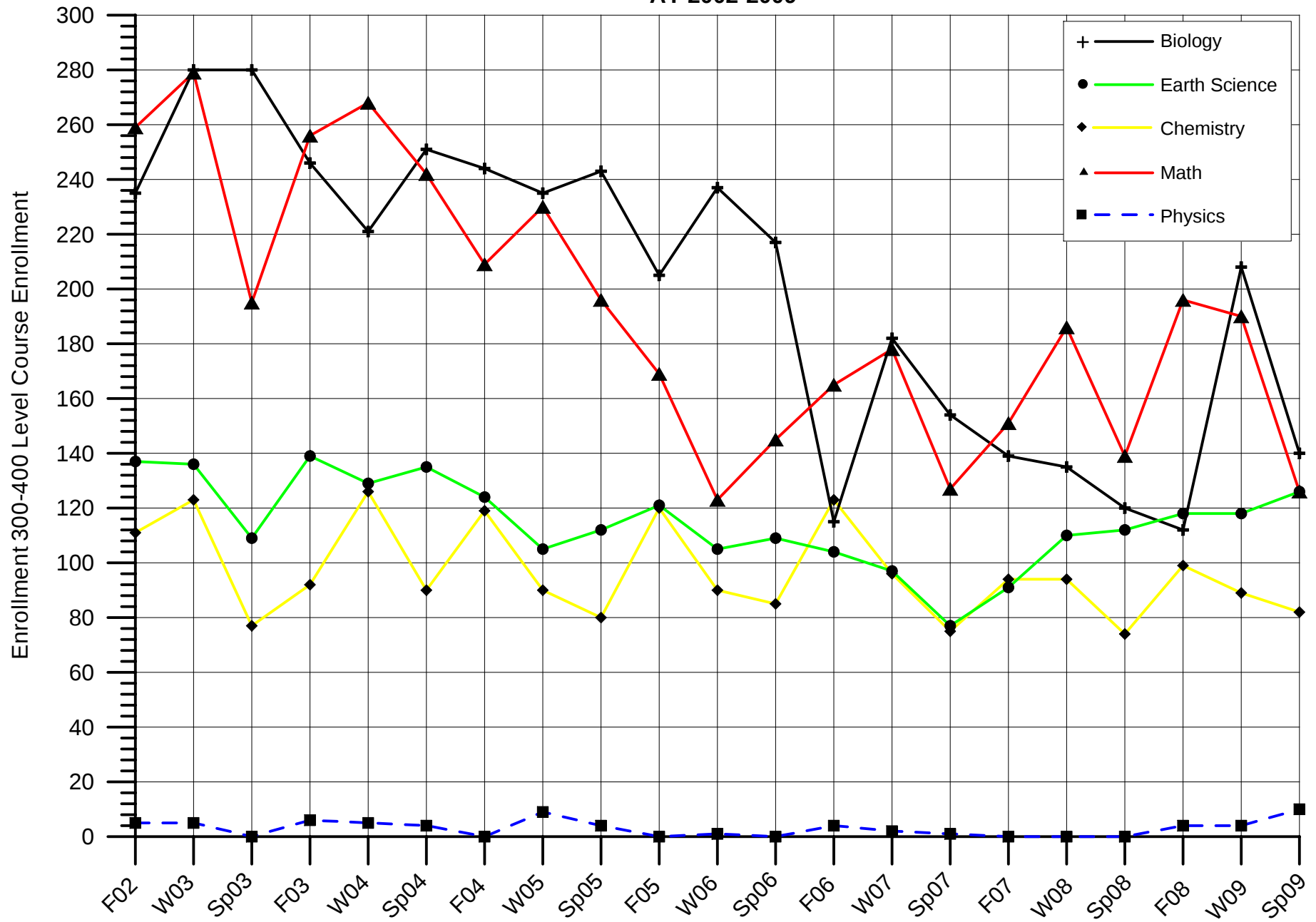


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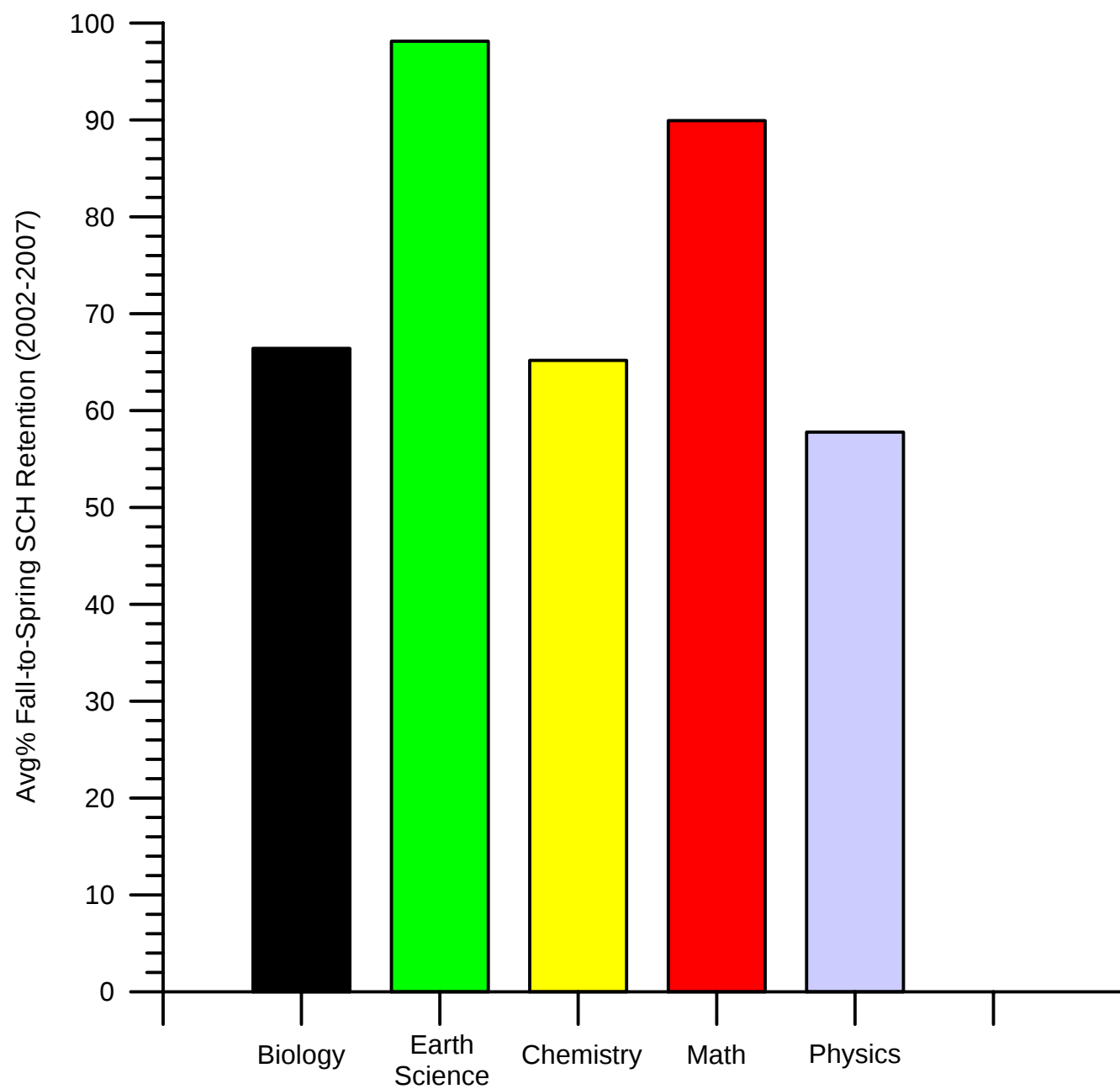


Figure 11. Natural Sciences and Mathematics Average Percent
Fall-to-Spring Retention 100-Level Courses
Academic Years 2002-2007

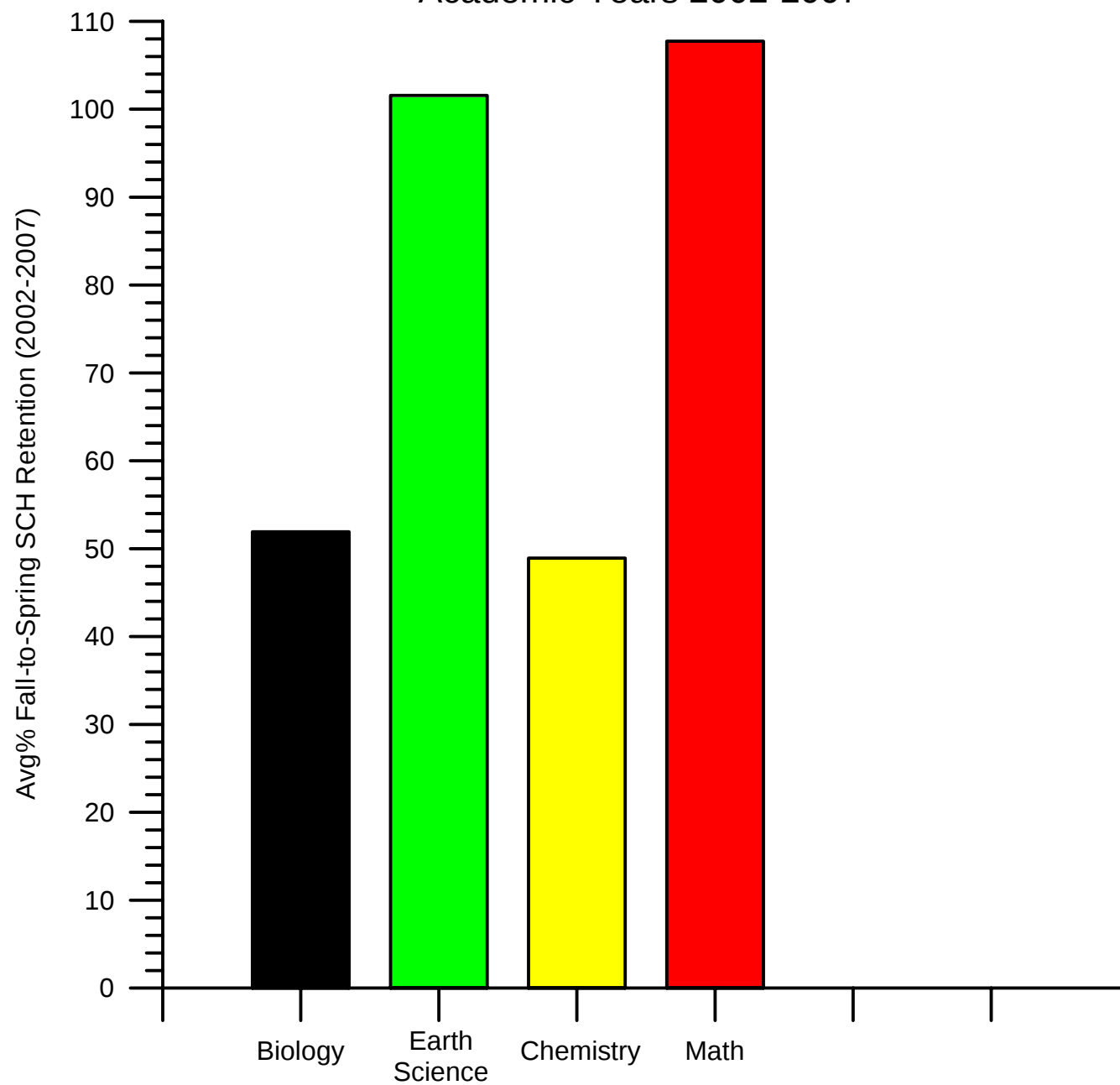


Figure 12. Natural Science and Mathematics Average Percent
Fall-to-Spring Retention 200-Level Courses
Academic Years 2002-2007

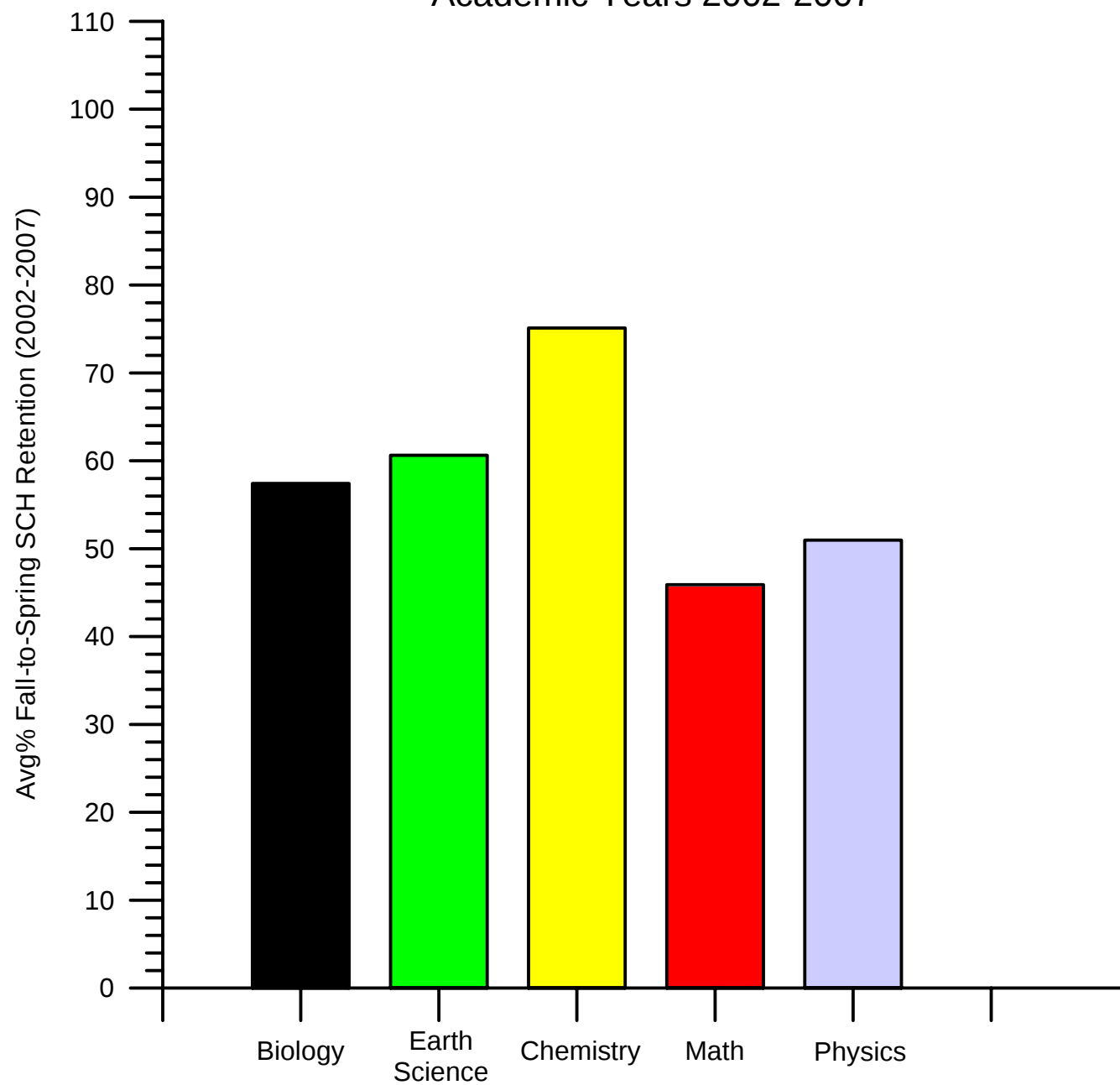
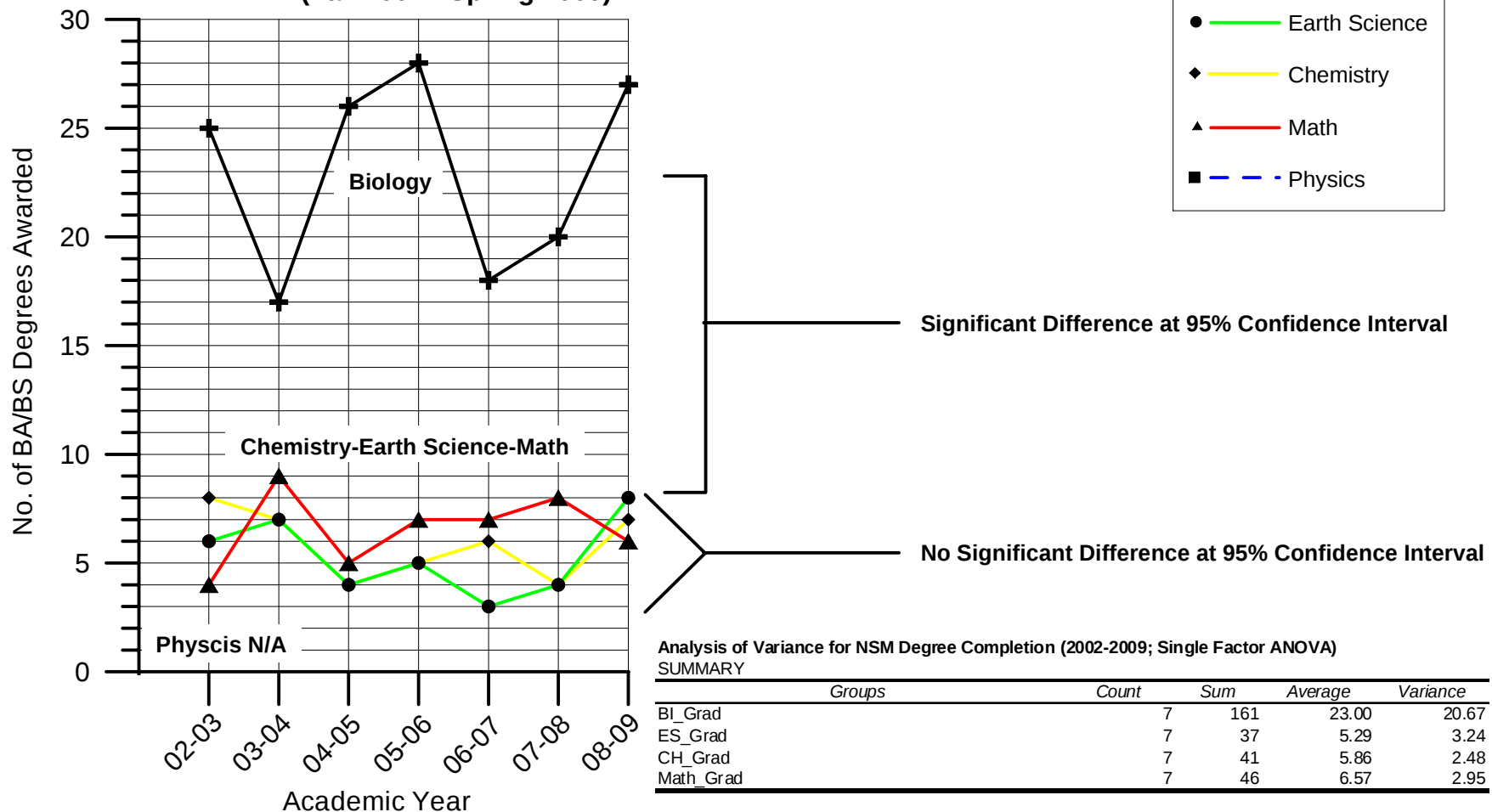


Figure 13. Natural Science and Mathematics Enrollment Trends
Baccalaureate (BS/BA) Degrees
(Fall 2002 - Spring 2009)



Analysis of Variance for NSM Degree Completion (2002-2009; Single Factor ANOVA)

SUMMARY

Groups	Count	Sum	Average	Variance
BI_Grad	7	161	23.00	20.67
ES_Grad	7	37	5.29	3.24
CH_Grad	7	41	5.86	2.48
Math_Grad	7	46	6.57	2.95

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	1540.11	3	513.37	70.00	5.19124E-12	3.01
Within Groups	176.00	24	7.33			
Total	1716.11	27				

NSM Graduation Rates (2002-2009)

Stepwise t-Test (Comparison of Means; BIO-CH/ES/MTH assumes unequal variances; CH-ES-MTH assumes equal variances; alpha = 0.05)

	Mean1	Mean2	Var1	Var2	No. Obs.	Hyp. Mean Diff.	df	t Stat	P(T<=t) one-tail	t Critical one-tail	P(T<=t) two-tail	t Critical two-tail
BIO-ESCI	23.0	5.3	20.7	3.2	7	0	8	9.586	0.0000	1.86	0.0000	2.31
BIO-CHEM	23.0	5.9	20.7	2.5	7	0	7	9.428	0.0000	1.89	0.0000	2.36
BIO-MATH	23.0	6.6	20.7	3.0	7	0	8	8.944	0.0000	1.86	0.0000	2.31
ESCI-CHEM	5.3	5.9	3.2	2.5	7	0	12	-0.63	0.2695	1.78	0.5390	2.18
ESCI-MATH	5.3	6.6	3.2	3.0	7	0	12	-1.37	0.0983	1.78	0.1966	2.18
CHEM-MATH	5.9	6.6	2.5	3.0	7	0	12	-0.81	0.2165	1.78	0.4331	2.18

**Figure 14. NSM Percentage of Adjunct Faculty to Total Faculty FTE
2002-2009 Academic Years**

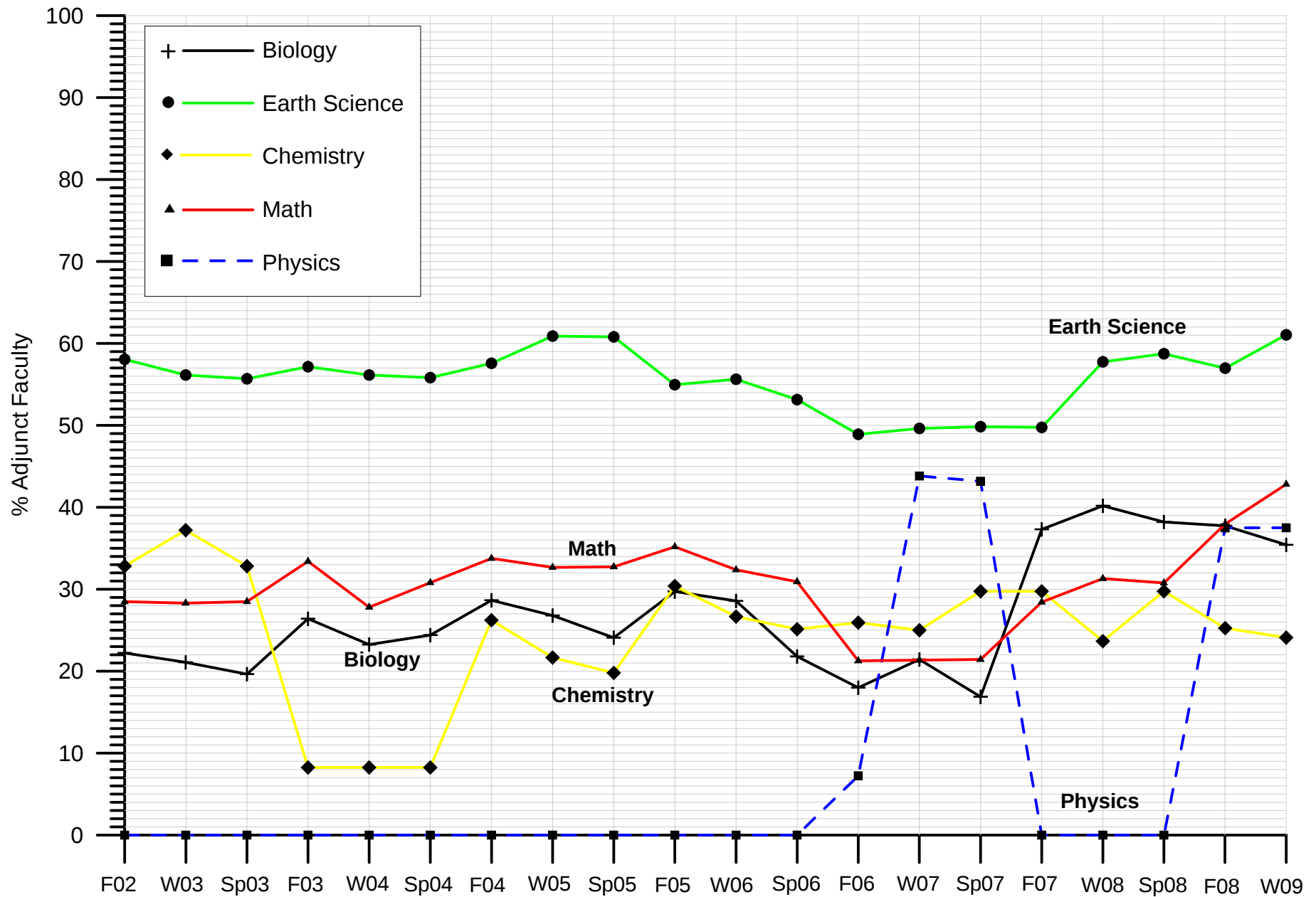
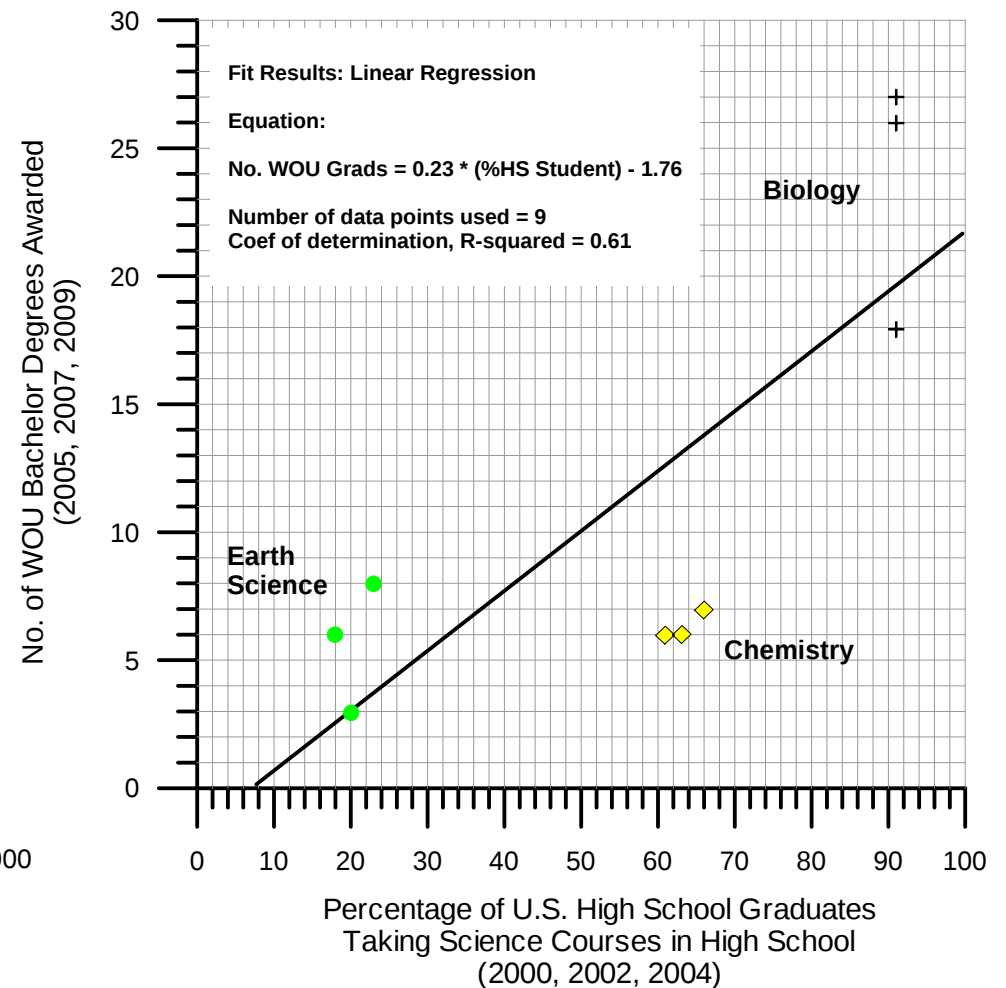
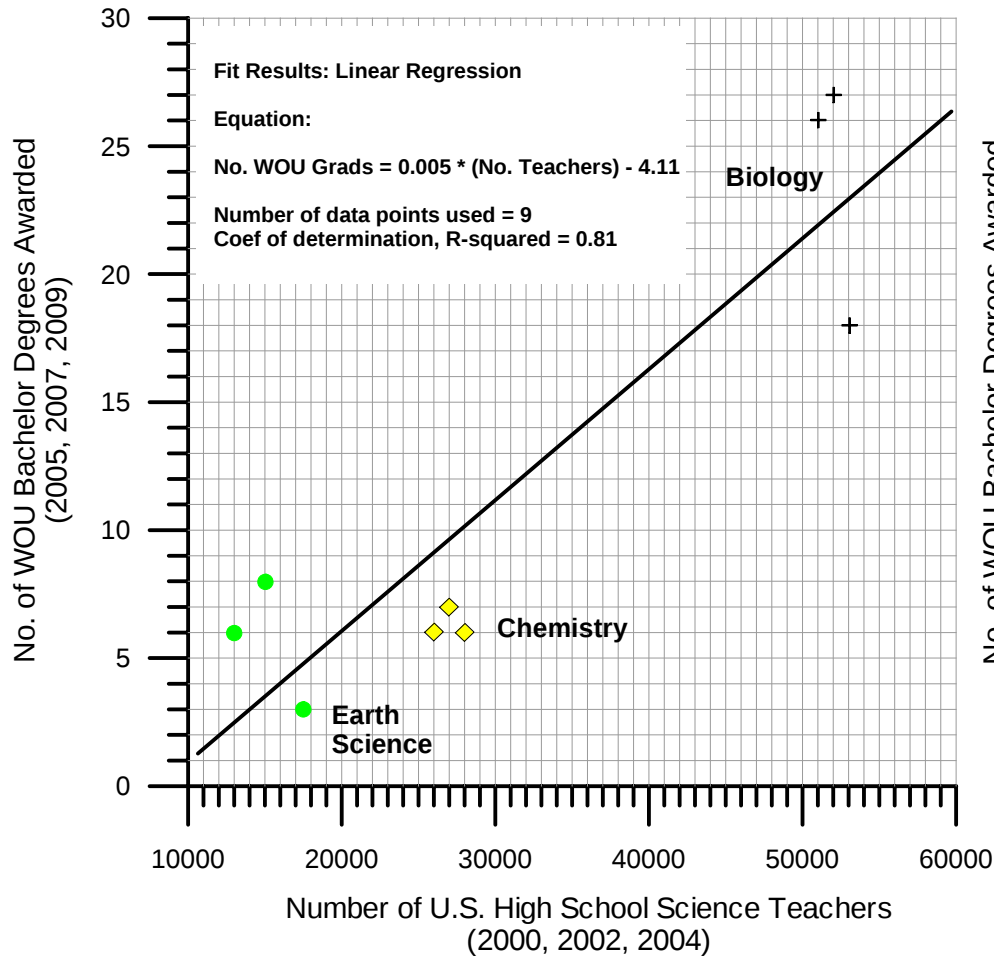


Figure 15. Plots of WOU Science Degrees Versus U.S. High School Science Education Practice, 2000-2009



Note: Comparative time periods for data comparison assumes an average of 5-years for college degree completion. Data sources: WOU graduation rates from Banner via Kathy Hill, CLAS. High School science data from CCSSO, State Indicators of Science and Mathematics, 2007; NCES, Digest of Education Statistics, 2007.

**Figure 16. Histogram Showing WOU Enrollment Trends and
NSM Division 100-200 Level Enrollments, Majors
and Pre-Professional Students**

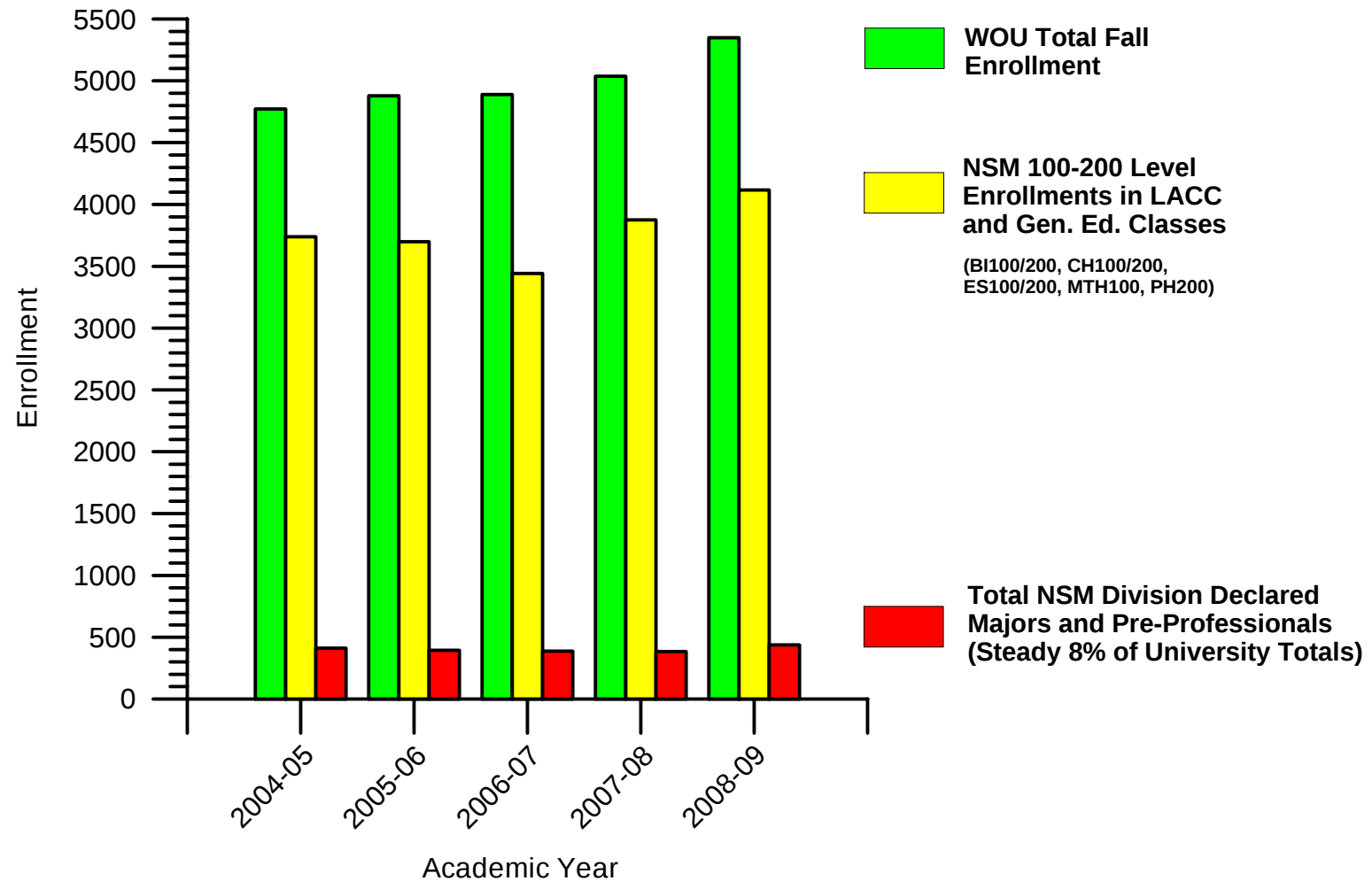


Table 1. Summary of Total Credit Hour Production (Course Enrollments x Credit Hours) 2002-2009

Source: via Banner by Joe Sendelbaugh, Director for Instit. Research, Aug. 27, 2007; Kathy Hill CLAS, 2007-2009

	Biology	Earth Science	Chemistry	Math	Physics	Geog	Term_ID
F2002	3509	3174	974	2643	284	2200	1
W2003	3120	3064	953	2582	200	2330	2
Sp2003	2445	2626	668	2323	152	2063	3
F2003	3565	2950	1054	2743	240	1736	4
W2004	2773	3053	967	2657	168	1498	5
Sp2004	2335	2791	801	2581	116	1211	6
F2004	3443	2551	1141	2566	96	1537	7
W2005	2806	3124	885	2747	168	1402	8
Sp2005	2289	2913	727	2322	108	1167	9
F2005	3524	2490	1208	2484	176	1273	10
W2006	2914	2827	870	2290	116	1224	11
Sp2006	2241	2715	750	2220	84	890	12
F2006	3242	2338	1170	2525	180	1194	13
W2007	2884	2581	886	2385	128	1024	14
Sp2007	2168	2207	670	2210	104	1063	15
F2007	3713	2498	1208	2210	172		16
W2008	3224	2856	1015	2218	112		17
Sp2008	2306	2680	798	2295	88		18
F2008	3773	2607	1484	2787	231		19
W2009	3670	2857	1182	2353	181		20
Sp2009	2321	2778	870	2420	135		21
Fall Avg	3538.4	2658.3	1177.0	2565.4	197.0	1588.0	
Winter Avg	3055.9	2908.9	965.4	2461.7	153.3	1495.6	
Spring Avg	2300.7	2672.9	754.9	2338.7	112.4	913.4	
Avg Per Term	2965.0	2746.7	965.8	2455.3	154.2	1454.1	
Avg Annual	8895.0	8240.0	2897.3	7365.9	462.7	4362.4	
Avg Percent Fall to Spring Credit Hour Loss	-35.0	-0.5	-35.9	-8.8	-42.9	-42.5	

No. of Enrolled Students x Credit Hours

Only includes number of students who completed the course, does not include withdrawals even though those students may have paid tuition

Table 2. Total No. of Students Enrolled in 100-Level Service Courses (Non-Majors) 2002-2009

Source: via Banner by Joe Sendelbaugh, Director for Instit. Research, Aug. 27, 2007; Kathy Hill CLAS, 2007-2009

	Biology	Earth Science	Chemistry	Math	Physics	Geog	Term_ID
F2002	439	500	75	109	n/a	390	1
W2003	363	481	54	150	n/a	432	2
Sp2003	229	415	38	137	n/a	375	3
F2003	446	467	81	160	n/a	316	4
W2004	342	483	58	142	n/a	249	5
Sp2004	224	446	52	147	n/a	212	6
F2004	422	417	107	138	n/a	278	7
W2005	337	535	63	150	n/a	226	8
Sp2005	230	505	49	151	n/a	189	9
F2005	458	403	108	146	n/a	207	10
W2006	333	471	68	157	n/a	186	11
Sp2006	226	462	47	154	n/a	158	12
F2006	390	386	97	157	n/a	213	13
W2007	298	438	63	169	n/a	160	14
Sp2007	210	379	43	176	n/a	179	15
F2007	403	420	126	167	n/a		16
W2008	320	472	79	201	n/a		17
Sp2008	186	449	56	221	n/a		18
F2008	405	410	171	214	n/a		19
W2009	339	448	114	248	n/a		20
Sp2009	159	456	72	233	n/a		21
Fall Avg	423.3	429.0	109.3	155.9		280.8	
Winter Avg	333.1	475.4	71.3	173.9		250.6	
Spring Avg	209.1	444.6	51.0	174.1		222.6	
Avg Per Term	321.9	449.7	77.2	168.0		251.3	
Avg Annual	965.6	1349.0	231.6	503.9		754.0	
Avg Percent Fall to Spring Enrollment Loss	-50.6	3.6	-53.3	11.7		-20.7	

COURSES INCLUDED IN TALLY:

Biology: BI101, BI102, BI103

Earth Science: ES104, ES105, ES106

Chemistry: CH104, CH105, CH106

Math: MTH105, MTH111, MTH112

Geography: GEOG105, GEOG106, GEOG107

Physics: No courses offered in this class

Physics does not offer 100-level courses

The Geography 100 courses serve both majors and LACC service

Geography does not offer 200-level introductory courses for majors

Table 3. Total No. of Students Enrolled in 200-Level Introductory Major/Minor/Service Courses 2002-2009
Source: via Banner by Joe Sendelbaugh, Director for Instit. Research, Aug. 27, 2007; Kathy Hill CLAS, 2007-2009

	Biology	Earth Science	Chemistry	Math	Physics	Geog	Term_ID
F2002	95	64	84	58	66		1
W2003	73	54	90	50	45		2
Sp2003	57	39	70	55	38		3
F2003	99	55	99	38	54		4
W2004	79	57	88	30	37		5
Sp2004	66	37	78	24	25		6
F2004	91	25	82	45	54		7
W2005	68	22	93	41	33		8
Sp2005	54	20	70	24	23		9
F2005	117	26	98	47	44		10
W2006	88	26	79	40	28		11
Sp2006	67	9	63	31	21		12
F2006	117	23	99	32	41		13
W2007	67	17	85	34	30		14
Sp2007	54	12	66	28	25		15
F2007	144	31	103	39	43		16
W2008	101	30	104	33	28		17
Sp2008	78	9	82	33	22		18
F2008	156	42	104	57	43		19
W2009	118	36	90	41	33		20
Sp2009	81	24	74	50	22		21
Fall Avg	117.0	38.0	95.6	45.1	49.3		
Winter Avg	84.9	34.6	89.9	38.4	33.4		
Spring Avg	65.3	21.4	71.9	35.0	25.1		
Avg Per Term	89.0	31.3	85.8	39.5	36.0		
Avg Annual	267.1	94.0	257.3	118.6	107.9		
Avg Percent Fall to Spring Enrollment Loss	-44.2	-43.6	-24.8	-22.5	-49.0		

COURSES INCLUDED IN TALLY:

Earth Science: ES201,ES202,ES203

Chemistry: CH221,CH222,CH223

Biology: BI211, BI212, BI213

Physics: PH201,PH202,PH203, PH211, PH212, PH213

Math: MTH251, MTH252, MTH253

Note: Fall 2004 was first term that the Earth Science program changed catalog prefixes from G201W,G202W,G203W to ES201W,ES202W,ES203W. This simple change resulted in a dramatic drop in enrollment. What happened?

Note: Geography does not offer 200-level introductory majors/minors/service courses. Geography majors enter the program through the 100-level sequence.

Table 4. Total No. of Students Enrolled in 300-400 Level Major/Minor/Service Courses 2002-2009
Source: via Banner by Joe Sendelbaugh, Director for Instit. Research, Aug. 27, 2007; Kathy Hill CLAS, 2007-2009

	Biology	Earth Science	Chemistry	Math	Physics	Geog	Term_ID
F2002	235	137	111	259	5		1
W2003	280	136	123	279	5		2
Sp2003	280	109	77	195	0		3
F2003	246	139	92	256	6		4
W2004	221	129	126	268	5		5
Sp2004	251	135	90	242	4		6
F2004	244	124	119	209	0		7
W2005	235	105	90	230	9		8
Sp2005	243	112	80	196	4		9
F2005	205	121	120	169	0		10
W2006	237	105	90	123	1		11
Sp2006	217	109	85	145	0		12
F2006	115	104	123	165	4		13
W2007	182	97	96	178	2		14
Sp2007	154	77	75	127	1		15
F2007	139	91	94	151	0		16
W2008	135	110	94	186	0		17
Sp2008	120	112	74	139	0		18
F2008	112	118	99	196	4		19
W2009	208	118	89	190	4		20
Sp2009	140	126	82	126	10		21
Fall Avg	185.1	119.1	108.3	200.7	2.7		
Winter Avg	214.0	114.3	101.1	207.7	3.7		
Spring Avg	200.7	111.4	80.4	167.1	2.7		
Avg Per Term	200.0	115.0	96.6	191.9	3.0		
Avg Annual	599.9	344.9	289.9	575.6	9.1		
Avg Percent Fall to Spring Enrollment Loss	8.4	-6.5	-25.7	-16.7	0.0		

COURSES INCLUDED IN TALLY:

Earth Science: ES301, ES302, ES303, ES321, ES322, ES331, ES341, ES351, ES354, ES390, ES392, ES406, ES407, ES431/531, ES450, ES453/553, ES454/554, ES473/573,

ES491/591, ES492/592, GS312, GS313, GS314, GS331, GS351, GS390ES476/576

Chemistry: CH310, CH312, CH313, CH320, CH334, CH335, CH336, CH338, CH340,

CH350, CH354, CH360, CH371, CH401, CH407, CH409, CH411, CH412, CH420, CH430,

CH431, CH432, CH440, CH441/551, CH442, CH450, CH451, CH452, CH461, CH462,

CH463, CH471, CH473, CH481/581

Biology: BI301, BI311, BI312, BI313, BI317, BI318, BI321, BI324, BI326, BI330, BI331, BI334,

BI335, BI336, BI341, BI357, BI360, BI361, BI370, BI371, BI388, BI406/506, BI407/507,

BI409, BI424, BI431, BI432, BI434, BI437, BI440, BI441/541, BI446, BI451, BI453/553,

BI454/554, BI458/558, BI461, BI465/565, BI471/571, BI474, BI475, BI506, BI507, BI541,

GS311

Physics: PH311, PH312, PH321, PH322, PH323, PH411, PH412, PH270, GS606

Math: MTH311, MTH312, MTH313, MTH314, MTH337, MTH338, MTH341, MTH344, MTH345,

MTH346, MTH351, MTH354, MTH355, MTH358, MTH363, MTH365, MTH366, MTH391,

MTH392, MTH393, MTH394, MTH395, MTH396, MTH398, MTH401, MTH402/502, MTH403,

MTH406, MTH407/507, MTH409/509, MTH410, MTH416, MTH420, MTH430, MTH440,

MTH441, MTH460, MTH472, MTH482, MTH490/590, MTH492/592, MTH493/593, MTH494/594,

MTH495/595, MTH589, MTH596, MTH597, MTH599

Note: Fall2006, Bio began separated BI234-235-236 from the 300-level A&P

From Fall2002-Spring2006, A&P was combined between the pre-health and majors

Noted drop in 300-400 level starting in fall2006 reflects this curriculum change

Note: Starting in Fall 2004, Earth Science curriculum changes were initiated that changed the "G" and "GS" prefixes to a uniform "ES" designation.

Note: Spring 2007, Taylor was on sabbatical, his classes were cancelled.

Fall2007 Taylor was on reduced load and ES322 was not offered.

Table 5. Total No. of Students Enrolled in NSM Pre-Nursing Courses 2006-2009

Source: via Banner by Joe Sendelbaugh, Director for Instit. Research, Aug. 27, 2007; Kathy Hill CLAS, 2007-2009

	BI102	CH1XX	BI23X	BI318	MTH243	Term_ID
F2006	100	97	93	N/A	29	13
W2007	269	63	112	49	29	14
Sp2007	N/A	43	74	N/A	27	15
F2007	123	126	139	N/A	30	16
W2008	296	79	168	48	24	17
Sp2008	N/A	56	141	N/A	55	18
F2008	146	171	151	N/A	60	19
W2009	323	114	172	45	36	20
Sp2009	N/A	72	164	25	57	21
Fall 2-yr %	46.0	76.3	62.4		106.9	
Winter 2-yr%	20.1	81.0	53.6	-8.2	24.1	
Sp 2-yr%	N/A	67.4	121.6		111.1	
Annual 2-yr%	27.1	75.8	74.6	42.9	80.0	

Table 6. Total No. of Graduates with Bachelor's Degrees in Program Area 2002-2009

Source: via Banner by Joe Sendelbaugh, Director for Instit. 2002-2003; Kathy Hill CLAS, 2004-2009

	Biology	Earth Science	Chemistry	Math	Physics	Geog	Year_ID
AY 2002-2003	25	6	8	4	n/a	7	2003
AY 2003-2004	17	7	7	9	n/a	10	2004
AY 2004-2005	26	6	6	6	n/a	2	2005
AY 2005-2006	29	5	4	7	n/a	4	2006
AY 2006-2007	18	3	6	7	n/a	7	2007
AY 2007-2008	20	4	4	8	n/a	5	2008
AY 2008-2009	27	8	7	6	n/a	3	2009
Avg Annual	23.1	5.6	6.0	6.7		5.4	
Max	29	8	8	9		10	
Min	17	3	4	4		2	

Table 7. Majors in Natural Sciences and Mathematics Programs Academic Years 2004-2009

Data Source: Banner via Kathy Hill CLAS, 2004-2009; spring 2009; OUS Web Site "Enrollment Watch" link

	Bio	Chem	Esci	GenSci	Int. Sci	Math	Nat. Sci	Pre-Chem	Pre-Prof	Pre-Prof/Sci	Total NSM	Total WOU Fall	%NSM	Year_ID
AY 2004-2005	122	55	28	0	0	32	10	0	24	140	411	4772	8.6	2005
AY 2005-2006	121	38	26	0	3	40	6	2	61	98	395	4879	8.1	2006
AY 2006-2007	136	30	22	9	2	45	0	11	110	23	388	4889	7.9	2007
AY 2007-2008	130	26	20	0	1	37	5	15	137	12	383	5037	7.6	2008
AY 2008-2009	111	22	27	0	0	36	2	9	229	1	437	5349	8.2	2009
Avg Annual	124.0	34.2	24.6	1.8	1.2	38.0	4.6	7.4	112.2	54.8	402.8	4985.2	8.1	
Max	136	55	28	9	3	45	10	15	229	140	437	5349	8.6	
Min	111	22	20	0	0	32	0	0	24	1	383	4772	7.6	

Table 8. Comparison of U.S. High School Science Program Data to WOU Science Degrees Awarded

Sources: Banner / Kathy Hill CLAS: CCSO State Indicators of Science and Mathematics; NCES, Digest of Education Statistics, 2007

%HS_students_2000_2004	No_HS_teachers_2000_2004	WOU_grads_2005_2009	Discipline	HSGrad_Year	WOUGrad_Year
91	51000	26	Biology	2000	2005
61	26000	6	Chemistry	2000	2005
18	13000	6	ESCI	2000	2005
91	53000	18	Biology	2002	2007
63	28000	6	Chemistry	2002	2007
20	17500	3	ESCI	2002	2007
91	52000	27	Biology	2004	2009
66	27000	7	Chemistry	2004	2009
23	15000	8	ESCI	2004	2009

Explanation:

%HS_Students = percentage of U.S. High School graduates taking science in High School

No_HS_teachers = Number of U.S. High School science teachers teaching in a given science discipline

WOU_grads = Number of WOU degrees awarded in a given science discipline

HSGrad_Year = Year of high school graduation

WOUGrad_Year = Year of anticipated WOU graduation, assuming average time to degree completion is 5 years.