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REVIEW REPORT

on the

**BIOLOGICAL SCIENCES
PROGRAM**

MARCH, 2000

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EXECUTIVE SUMMARY

The Biological Sciences Program Review Committee found the Biological Sciences Program to be a fundamentally sound operation. Its strengths are the commitment and dedication of its faculty and its determination to control class sizes in upper level courses. The Department has also launched several original and imaginative initiatives in the last few years, including the co-operative education option and collaborative course delivery and research with members of other departments. The Committee agrees with the faculty that the Wells Gray Research and Education Centre has huge potential for development.

Like many large departments, however, Biological Sciences has developed several stresses and strains in its expansion over the last ten years. The Committee believes that these could be addressed and alleviated by two measures: working towards departmental consensus and inclusiveness, and, building on that, constructing a five-year plan which utilizes departmental expertise to the fullest and prioritizes future departmental initiatives and directions.

While upper level course shortages and lower level class sizes were identified as concerns, the Committee feels that these can be addressed in a variety of ways that are not all budget-dependent: for example, a more comprehensive deployment of departmental personnel; course rotation; loosening of co- and pre-requisites; cross-listing with Natural Resource Science courses; and summer school offerings. The Committee would like to see these implemented before the department argues its case for additional faculty positions.

On the question of resources, the Committee agrees with the faculty that closer collaboration is required with the Library in journal acquisition, and that research lab space and health and safety issues should be institutional priorities. Other institution-wide concerns are the impasse on Federal research grants being distributed to students, and the consistency of academic advising. Several suggestions are also made to the department in the areas of curriculum, teaching and evaluation.

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BIOLOGICAL SCIENCES PROGRAM REVIEW
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CHRONOLOGY OF THE BIOLOGICAL SCIENCES PROGRAM REVIEW

The Biological Sciences Program Review was started on June 2, 1999, with a meeting between the Biological Sciences Department and Alastair Watt, Director, Institutional Research and Planning. A Biological Sciences Program Review Steering Committee consisting of Lyn Jessee, Val Collins, Tom Dickinson, Louis Gosselin and Anne Harrison and Mairi MacKay developed Faculty and Former Student questionnaires over the summer, and finalized them by early October. Questionnaires were sent or administered to the following groups of stakeholders on the dates indicated below:

Faculty	October 5, 1999
Former Students (1996-99)	October 7, 1999
Kamloops Current Students (Yrs 2,3,4)	November 15, 1999
Williams Lake Current Students	November 18, 1999

In addition to the responses collected from the UCC-designed Former Student survey, data from the period 1995 to 1998 were drawn from the annual Provincial Student Outcomes Surveys, using the Student Outcomes Reporting System (SORS).

Non-responding former students were sent a reminder on October 28, 1999, and attempts were made by telephone between November 16 and 19 to contact those who had still not responded. Faculty responses were completed by November 10.

The cut-off date for all responses was December 14, 1999. Information packages containing data and documentation on the Biological Sciences Program were sent to members of the Biological Sciences Program Evaluation Committee on December 21, and that team met to analyze and discuss the data, interview faculty and students, and formulate its findings on the program on January 20 and 21, 2000.

ADMISSION REQUIREMENTS

Biological Sciences constitutes part of the Bachelor of Science degree program, and students with a 'Biological Sciences' focus can complete either a General Science degree with a concentration in Biological Sciences, or a Major in one of three areas: Animal Biology; Ecology and Environmental Biology; General Biology. The Biological Sciences Department also provides service courses (BIOL 159/169) to the Nursing and Respiratory Therapy programs.

Admission to first year sciences falls under the general requirements of admission to UCC: B.C. grade 12 graduation or mature student status. However, there are some specific requirements to enter the first year Biological Sciences courses:

Biology 11 with a grade of C+ or better and Chemistry 11.

Admission to the B.Sc. program is at the first year level and students determine whether they will pursue a Major or a General Degree before entering year three of the program.

First year requirements for all Biological Sciences degrees (Majors and General with a Biological Sciences concentration) include six credits of Biology (specifically BIOL 111/121), six credits of Chemistry, six credits of Physics, six credits of Computing Science (specifically COMP 100) and either three or six credits of English (the necessity for a second course is dependent upon the grade received in the first English course).

Second year requirements for all Biological Sciences degrees include three credits of English (either ENGL 229 or 230), specific Biology courses (BIOL 213 and 234) and a selection of other Biological Sciences courses that are identified for each Major (chosen from BIOL 210, 211, 215, 220, 221 and 225). Students in the General Science program need to select those Biology courses that are pre-requisites to the Biology courses that they will complete in third and fourth year.

Graduation requires the completion of 120 credits overall. For the General Degree, a Biological Sciences concentration requires the completion of a minimum of 18 credits of 300/400 level BIOL courses. A Major requires the completion of a minimum of 30 - 39 credits of 300/400 level BIOL courses, the number of credits dependent upon the specific Major. All B.Sc. degrees require the completion of a minimum of 48 credits at the 300/400 level.

B.Sc. Co-operative Education Degree Option

B.Sc. Students majoring in Biological Sciences may apply to enter a Co-op Education option in their program. Co-op Education integrates academic studies with paid periods of relevant work experience and extends the graduation date by a year. Advantages of the Co-op option are that students acquire paid job experience in the field of their major and potential employers are exposed to potential employees. Placement in the Co-op program is competitive and the number of jobs available will depend on the number of participating employers. Students are not guaranteed a job placement in any given work term.

Admission to the B.Sc. Co-op option is limited. Students are chosen by a selection committee based on grades, completion of specific courses in the discipline, previous work, volunteer experience and a letter of application. Successful students participate in a "Working to Learn" course which offers instruction in job finding skills and workplace professionalism.

Applicants must have maintained a B+ average (minimum) in Biology courses and must maintain a cumulative GPA of 3.0 (minimum) in all B.Sc. degree courses. Students must complete four Co-op work terms to graduate with Co-op designation on their transcripts.

SEAT UTILIZATION – FALL SEMESTER ONLY

The following takes into account the stable enrollment and capacity for the following semesters: fall 1997, fall 1998 and fall 1999.

Biological Sciences

Year	Lower level enrollment	Lower level capacity (#of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
1997	788	830	95%	235	236	100%	1023	1066	96%
1998	808	810	100%	261	311	84%	1069	1121	95%
1999	876	900	97%	270	308	88%	1146	1208	95%

Comparison with other Science disciplines for the same period:

Fall 1997

Discipline	Lower level enrollment	Lower level capacity (#of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
BIOLOGICAL SCIENCES	788	830	95%	235	236	100%	1023	1066	96%
PHYSICS	361	393	92%	34	47	72%	395	440	90%
CHEMISTRY	481	526	91%	102	133	77%	583	659	88%

Fall 1998

Discipline	Lower level enrollment	Lower level capacity (#of seats)	Lower level % utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level % utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
BIOLOGICAL SCIENCES	808	810	100%	261	311	84%	1069	1121	95%
PHYSICS	385	413	93%	33	50	66%	418	463	90%
CHEMISTRY	479	489	98%	93	163	57%	572	652	88%

Fall 1999

Discipline	Lower level enrollment	Lower level capacity (#of seats)	Lower level utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
BIOLOGICAL SCIENCES	876	900	97%	270	308	88%	1146	1208	95%
PHYSICS	378	431	88%	18	44	41%	396	475	83%
CHEMISTRY	466	501	93%	109	142	77%	575	643	90%

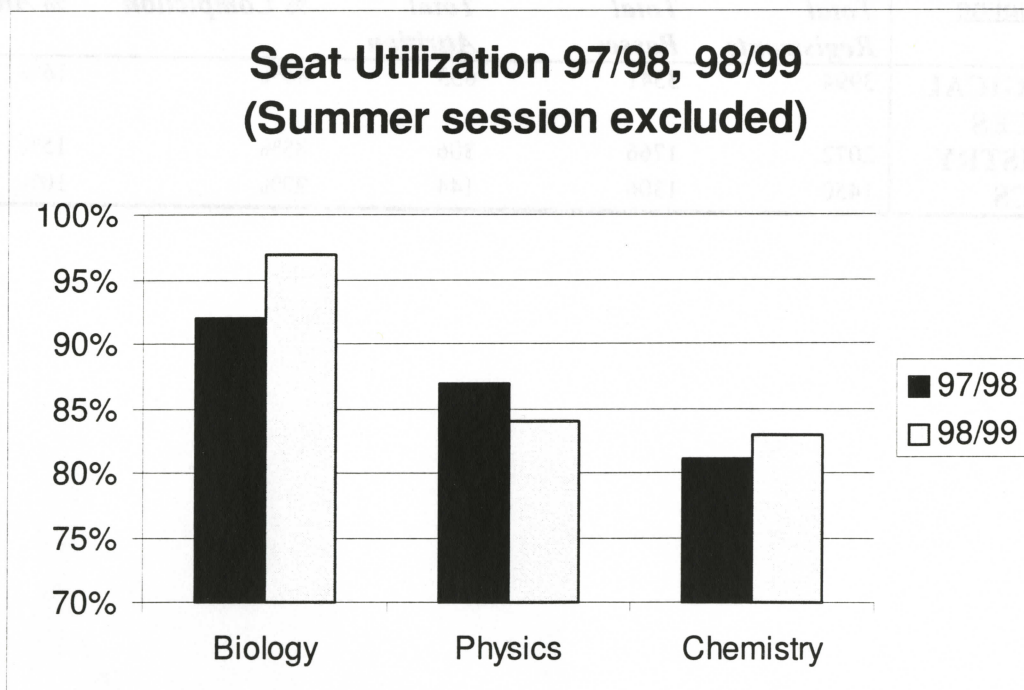
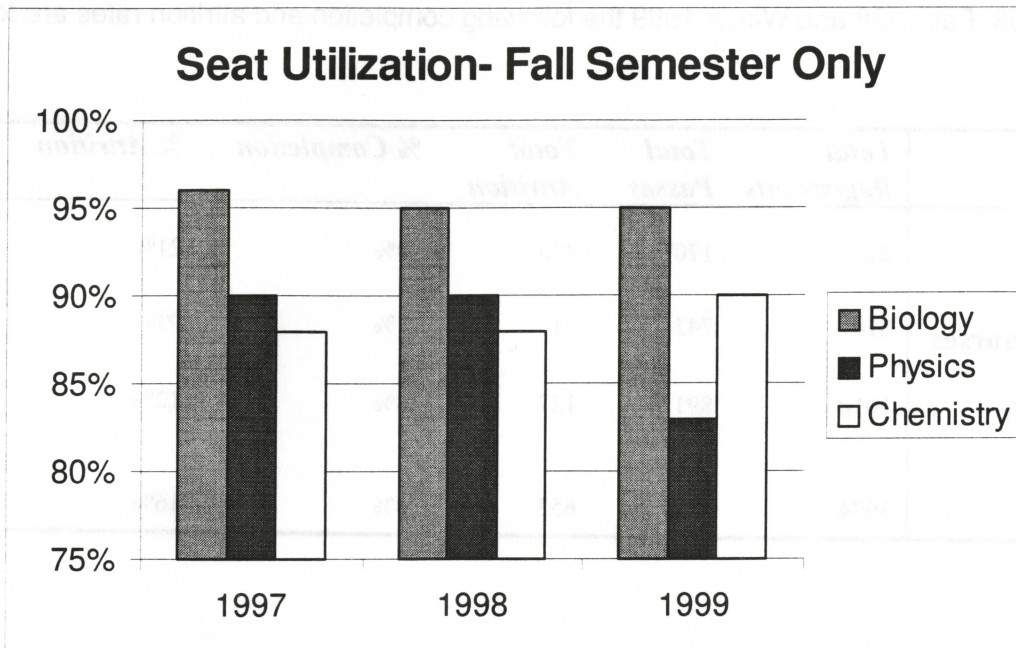
1997/98 (Fall/Winter)

Discipline	Lower level enrollment	Lower level capacity (#of seats)	Lower level utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
BIOLOGICAL SCIENCES	1459	1606	90%	511	533	96%	1970	2139	92%
PHYSICS	702	797	88%	55	73	75%	757	870	87%
CHEMISTRY	873	987	88%	192	322	60%	1065	1309	81%

1998/99 (Fall/Winter)

Discipline	Lower level enrollment	Lower level capacity (#of seats)	Lower level utilization	Upper level enrollment	Upper level capacity (# of seats)	Upper level utilization	Total enrollment	Total capacity (#of seats)	Total % utilization
BIOLOGICAL SCIENCES	1517	1514	100%	507	578	88%	2024	2092	97%
PHYSICS	642	740	87%	51	82	62%	693	822	84%
CHEMISTRY	849	910	93%	158	298	53%	1007	1208	83%

Completion rates may be determined by subtracting the percentage of students who did not complete the program from the percentage of students who completed the program. For example, if 95% of students completed the program, the completion rate is 95%. The period of Fall 1997 to Fall 1999 is used for the completion rates.



BIOLOGICAL SCIENCES PROGRAM COMPLETION RATES

Completion rates may be determined by subtracting "fail" (F), "did not complete" (DNC), "withdrew" (W), "audit" (AUD) from enrollment numbers. Hence, over the period of Fall 1997, Winter 1998, Fall 1998 and Winter 1999 the following completion and attrition rates are found:

	<i>Total Registrants</i>	<i>Total Passes</i>	<i>Total Attrition</i>	<i>% Completion</i>	<i>% Attrition</i>
First year courses	2162	1707	455	79%	21%
2nd year courses	814	743	71	91%	9%
3rd/4th year courses	1018	891	127	88%	12%
Total	3994	3341	653	84%	16%

Completion rates compared to other Science disciplines:

<u>Discipline</u>	<i>Total Registrants</i>	<i>Total Passes</i>	<i>Total Attrition</i>	<i>% Completion</i>	<i>% Attrition</i>
BIOLOGICAL SCIENCES	3994	3341	653	84%	16%
CHEMISTRY	2072	1766	306	85%	15%
PHYSICS	1450	1306	144	90%	10%

GRADUATION HEADCOUNTS

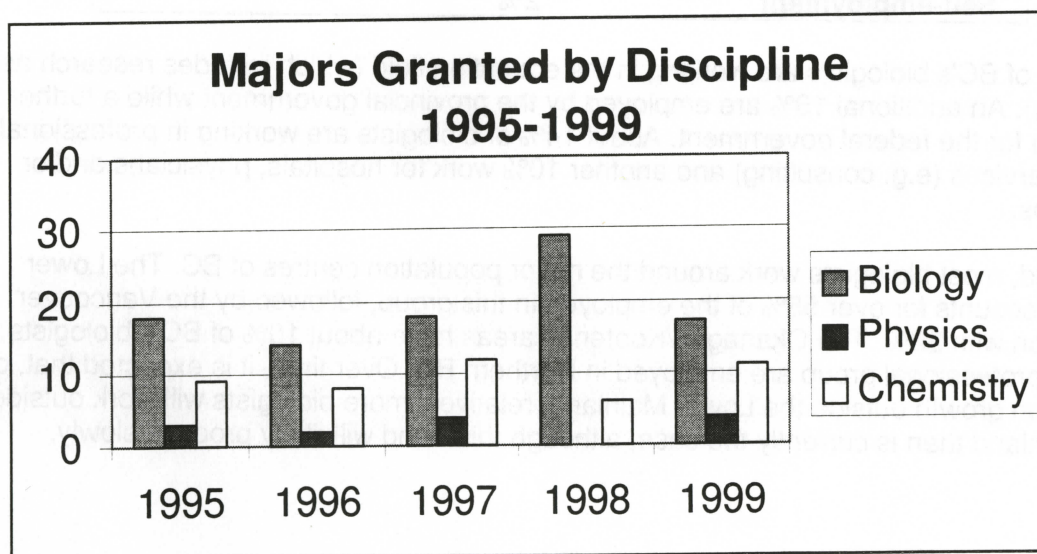
The following table reflects the number of graduating Biological Sciences Majors since 1995

Major	1995	1996	1997	1998	1999	2000 (estimated)	TOTAL
Animal Biology	14	4	8	10	7	12	55
Cell Biology & Genetics		1		1	1		3
Ecology & Environmental Biology		5	3	9	3	9	29
General Biology	4	4	7	9	5	15	44
Marine Biology					1		1
TOTAL	18	14	18	29	17	36	132

Graduation numbers from 1998, 1999 and 2000 reflect recipients of UCC degrees and UBC in conjunction with UCC degrees.

The following table reflects numbers of major degrees granted by discipline since 1995:

	1995	1996	1997	1998	1999	Total
Biological Sciences	18	14	18	29	17	96
Physics	3	2	4	0	4	13
Chemistry	9	8	12	6	11	46



EMPLOYMENT PROSPECTS¹

The projected growth rate for biologists in BC to the year 2005 is well below the provincial average growth rate for all occupations. While the projected growth figures may be too low, this profession has had a major expansionary period between 1990 and 1995 in the province. Demand for biologists from new college, research and industry positions is likely to slow after this period of strong growth since most development needs have now been met. In addition, a significant number of biologists are employed by either the provincial and/or federal government, and as governments are likely to face continuing financial pressures to downsize, overall demand for biologists may be lowered due to government restraint. There is a fundamental shift occurring between purely traditional government employment and rising private-sector activities. There is likely to be more growth in private sector research (or joint projects involving both the private sector and government) in traditional fields of biology, as well as growth in bio-tech firms, an increasing number of which are locating in BC. Individuals entering this field will increasingly be looking at contract and part-time work as well as self-employment as project-based work replaces some permanent jobs in government and education.

Trends and Projections

	1990	1995	2005
Number Employed	1150	1720	1840
Estimated Openings 1995-2005	Growth (Net)	Attrition	Total
	120	150	270
Annual Growth 1995-2005	0.7%		
Main Industries of Employment			
Education	22%		
Provincial Government	19%		
Federal Administration	17%		
Employment by Region			
Lower Mainland	55%		
Vancouver Island	28%		
Northern BC	7%		
Okanagan/Kootenay	10%		
Self-employment	2%		

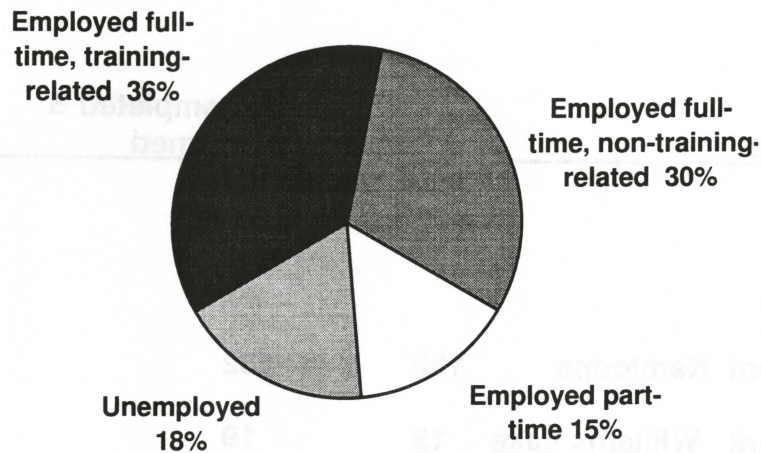
About 22% of BC's biologists are working in the education field (which includes research as well as teaching). An additional 19% are employed by the provincial government while a further 17% are working for the federal government. About 14% of biologists are working in professional business services (e.g. consulting) and another 10% work for hospitals, physicians and/or medical labs.

As expected, most biologists work around the major population centres of BC. The Lower Mainland accounts for over 55% of the employed in this group, followed by the Vancouver Island region with 28%. The Okanagan/Kootenay areas have about 10% of BC's biologists while 7% of this professional group are employed in Northern BC. Over time, it is expected that, due to population growth outside the Lower Mainland, relatively more biologists will work outside the Lower Mainland than is currently the case, although this trend will likely proceed slowly.

¹ Source: BC Work Futures (NOC 2121)

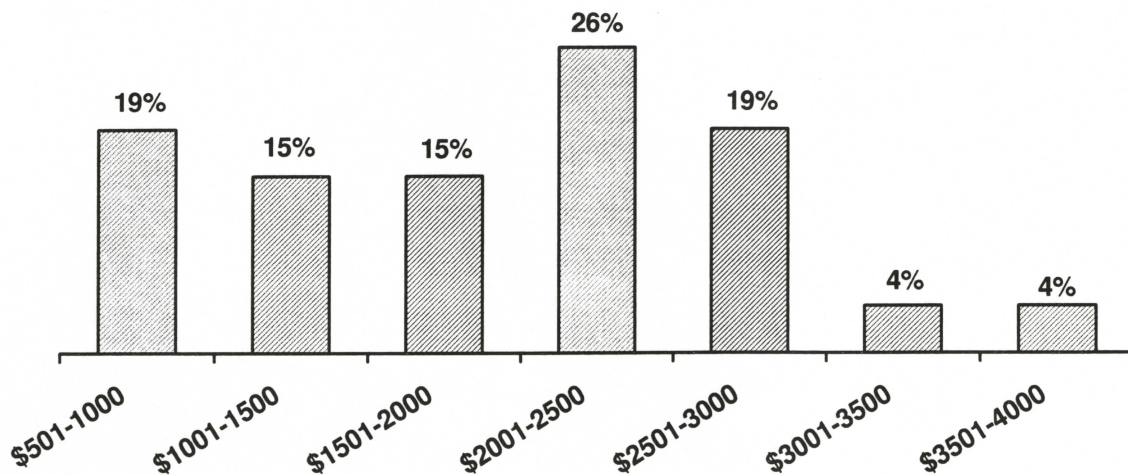
EMPLOYMENT OUTCOMES OF FORMER STUDENTS

Employment of Former Biology Students **1995-1998 Student Outcomes (n=33)**



SALARIES OF FORMER STUDENTS²

Gross Monthly Salary of Biology Students **1995-1998 Student Outcomes (n=27)**



² Salaries of former students one year after leaving the program.

TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES
BIOLOGICAL SCIENCES PROGRAM REVIEW

Recipient	# Sent	# Completed & Returned	% Returned
Faculty	22	20	91%
Students:			
Current Kamloops	132	132	100%
Current Williams Lake	19	19	100%
Former	86	41	48%
SORS Data (BC College & Institutes Student Outcomes Data 1995-1998)	60	43	72%
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TOTAL	319	255	80%
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SUMMARY OF QUESTIONNAIRE RESPONSES

1. FORMER STUDENTS

Former students identified the following strengths in the Biological Sciences Program (in no particular order): the Wells Gray Education and Research Centre; the attitude, commitment and knowledge of the instructors; and the small class sizes.

They did, however, identify concerns as well. These can be grouped into two broad categories: those pertaining to the department and its responsibilities, and those pertaining to the institution. One institutional concern was academic advising. Students indicated that the advice they received seemed to vary from advisor to advisor, that it was often incorrect, and that it occasionally resulted in their having to spend an additional semester at UCC. A second institutional concern centred around library resources, both the shortage of journals and the delays incurred when using the inter-library loan system.

As for concerns about the department and the program, we can further subdivide them into personnel and non-personnel issues. Former students wanted to have more upper level course options (e.g. genetics, microbiology, biochemistry, botany). They would like to see the program include more fieldwork, more statistical analysis, more problem-solving skills, and more presentations. They would like exposure to more off-campus speakers (active researchers), and more information on different Masters' programs. There was even a suggestion that co-op should be compulsory (which this committee views as a very positive endorsement of the co-op program).

Finally, several former students called for more faculty within the department; they felt that this would address the issue of broadening the course selection. The students also recognized a shortage of research space for faculty and wanted to see that problem addressed. On the other hand, the criticisms they had of faculty were that (i) some instructors took too long in returning marked exams, and that (ii) there was insufficient opportunity to evaluate courses (and, in some instances, instructors).

2. CURRENT STUDENTS

Again students pointed out their high regard for the Biological Sciences faculty. Another strength was the small (upper level) class sizes. The concerns that surfaced among the current students were academic advising (poor advice and difficulty in getting an appointment), the shortage of journals in the library, the inadequacy of the fume hoods in the labs, and the unreliability of computers.

Current students identified other concerns: questionable pre-requisites, large class sizes in first and second year Biology courses, lack of course choice (more courses requested in microbiology, biochemistry, genetics, and botany), lack of upper level summer courses, and limited opportunity to enroll in Natural Resource Science (NRS) courses. There was also a request for B.Sc. advising at second year to review course selections and program options.

Some current students felt that more faculty were needed in the department. They also wanted better access to written information on (i) postgraduate requirements, (ii) employability, and (iii) transfer credits. There were some concerns about course delivery. For example, it was mentioned that some midterms are too late to be of use to a student who may be considering withdrawal. As well, students would like more weight placed on assignments and less on exams (especially final exams). Some wanted to be informed earlier in a semester about major projects, so that they can better manage their time. There was also a concern that the lecture format was used almost exclusively in some courses, and a desire for more opportunity to

evaluate courses. Lastly, several students suggested that some instructors could improve their teaching methods, one such comment also being directed at a required course (English).

3. FACULTY

Faculty concerns can for the most part be broadly classified into those pertaining to facilities, institutional support, communication, pedagogy, and professionalism. The facilities concerns include such items as inadequate research space, shortage of lab and storage space, and problem with the "bumpy" flooring in the Science Building. There was certainly recognition of the fact that the Science Building was not designed to accommodate both traditional sciences and the Natural Resource Science Program, launched in 1992.

As for institutional support, there was a sense among faculty that the institution is providing neither adequate time nor dollars to support research within the department. Nor was it felt that the institution is capable of providing support for those who wish to introduce new technology into their courses. Many felt that there is insufficient budget for regular replacement of old equipment. One very large concern was expressed over the inability of the institution to provide an environment for student research opportunities, even when the funding came from outside agencies, because of CUPE intervention; this has created much frustration among faculty. As well, lab demos responsible for creating or updating lab manuals are currently using out-of-date computers, and perceived journal shortages in the library were also a bone of contention.

A wide range of opinions exists in the Department on the question of departmental goals and objectives, from believing that departmental goals were well known and understood, to wondering what they were, and how one could find out! Divergence of departmental opinion was further demonstrated when different faculty members had quite different ideas on what direction the department should take. Some wanted an honours program, some a post-graduate certificate, some a broadening of upper year course offerings, some a reduction of first and second year class sizes, and some an increase in faculty. One respondent commented that there was lack of a "team" approach within the department. In addition to concerns about communication within the department, many felt that they needed to improve communications within the entire division, perhaps by holding more regular divisional meetings. Several persons mentioned that the current amount of chair release is quite insufficient.

Among pedagogical concerns raised was the desire to have selective admissions and a C+ requirement in courses serving as prerequisites to others. One faculty member suggested that upper level courses are only updated when the instructor is changed or retires. Concern was expressed over the apparent potential of replacing some Biology labs with computers and CDs. The COMP 100 course, which was originally designed specifically for Science, is not seen as doing what it promised to do. While we saw earlier that students (both former and current) wanted more opportunities to evaluate courses, faculty quite strongly felt that students had ample opportunity to do these evaluations — one faculty member even questioning the value or importance of such student evaluations. On the other hand, one very positive suggestion was made here: faculty should be encouraged to visit a research facility every three years for the purpose of updating on techniques and development in his/her area; this is not to be confused with a sabbatical to do research, but would simply be professional development.

Under the category of professionalism, there was a concern that some faculty members were not adhering to their posted office hours. In addition, one faculty member took the opportunity provided by this survey to question the credibility of the current chair in the eyes of other institutions and agencies.

STRENGTHS OF THE PROGRAM

Throughout all the survey material there were consistent motifs suggesting the strengths of the Biological Sciences Program. They include the following:

- **Faculty Attributes:**

The Review Committee was extremely impressed with the achievements of UCC's Biological Sciences Department, including excellence in teaching, scholarship and service to the community and institution; this impression of excellence emerged from the achievements and dedication of all department members. Both former and current students commented on the commitment, knowledge and dedication of the Biological Sciences faculty. Members of the department were perceived to be caring and concerned about their students.

- **Small Upper Level Class Sizes:**

While lower level class sizes elicited criticism and complaint, students were very positive about the smaller class sizes in upper level courses. The Biological Sciences Department will be challenged to maintain small upper level class sizes in the future (while maximizing enrolments) and to return first and second year classes to manageable levels.

- **Co-operative Education:**

The Biological Sciences Co-op option launched in 1997 has proved popular with students and should see expansion in the next few years. As work placements provide students with the advantages of work experience and job familiarity as compared to traditional academic graduates, the Co-op option may be seen as an instrument for increasing the employment rates of Biological Sciences graduates in the field in which they were educated.

- **Wells Gray Education and Research Centre:**

Both external representatives on the Biological Sciences Review Committee commented very positively on the Wells Gray Education and Research Centre and the opportunities it offers. It is a unique facility and operation, situated near Clearwater, BC, some two hours north of Kamloops, offering opportunities to instructors and students not only from UCC but from the BC University College Consortium and the universities in BC and Alberta to study a unique, pristine wilderness park which includes a complete watershed within its boundaries. With a sound business plan, an energetic director with a fund-raising mandate, and a broadly representative and work-oriented management committee drawn from the BCUC Consortium and the universities, the Wells Gray Education and Research Centre could be developed into a field station that would, in its own way, rival the Bamfield Marine Station.

- **Collaborative Activities:**

The Review Committee was impressed with the collaborative nature of many of the Biological Sciences faculty's activities—both pedagogical and scholastic. It sees exemplified in these intra- and interdepartmental projects the spirit of interdisciplinary and interpersonal communication and co-operation that UCC seeks to foster, and applauds the Biological Sciences faculty for their work in these areas.

AREAS OF BIOLOGICAL SCIENCES WHICH CAN BE IMPROVED **(WITH RECOMMENDATIONS)**

The Biological Sciences Review Committee identified the following areas in the program as having room for improvement:

1. DEPARTMENTAL GOALS:

The Biological Sciences Department has experienced impressive growth over the past decade, due largely to the commitment and efforts of its members; however, this growth appears to have outpaced the department's planning practices. Though 60% of the department members felt that the department had explicit goals and objectives, only 40% felt that these goals and objectives were clear, and only 20% felt that they were being achieved. One faculty member wrote, "The department has clear goals," while another wrote, "We don't really have explicit goals written down anywhere." Although several members of the Biological Sciences Department indicated the need for more faculty as essential to the development of the Biological Sciences Program, there was no consensus among these members about what areas of expertise should have priority in faculty expansion and renewal; the faculty needs to reach such a consensus. One faculty member even argued that new faculty should be "put on the back burner" until the department has established a plan for growth. The Review Committee was unanimous in recommending that a detailed and explicit document be prepared immediately to specify the department's goals and values for the next five years. This document must be created with full and open consultation with all department members; the department might well be able to use such a document to persuade the administration of the urgency of their need for more faculty. The survey responses in the review indicated several areas to be addressed in the document, and are included here as part of the following recommendation.

RECOMMENDATION 1 (a): The Biological Sciences Program requires a clear and detailed 5-year plan for development which should be written after full and open consultation with all department members, and which

- i) **is consistent with UCC Strategic Plan and Mission Statement;**
- ii) **ensures the development of research opportunities for students, including the more effective use of lab demonstrators in student research projects;**
- iii) **develops the potential for further professional development and research opportunities for all department members, including lab demonstrators;**
- iv) **facilitates further development of the Wells Gray Education and Research Centre, including the appointment of a UCC-based Director with BCUC Consortium support;**
- v) **provides a strategy to return first and second-year classes to manageable sizes; and**
- vi) **should be reviewed and updated annually by the whole department.**

ACTION: Biological Sciences Department

Further, the Committee recommends that:

RECOMMENDATION 1 (b): A facilitator be engaged to ensure that discussions lead to the substantial consensus necessary if the department is to take full advantage of the many opportunities and challenges that are ahead.

ACTION: Biological Sciences Department

2. DEPARTMENTAL GOVERNANCE:

a) Department meetings: The recent arrangement of splitting of department meetings into two groups—instructors and lab demonstrators—has clearly created significant problems in communication among department members.

RECOMMENDATION 2(a): Biological Sciences Department meetings should include all department members whenever issues of substance will be discussed or decided. The department must define what items will be considered to be substantial through full and open discussion among all department members. If there is a perceived need for subgroups of the department to meet and discuss issues of concern among themselves, then these subgroups should be seen as forming subcommittees with an inherent obligation of bringing recommendations to the department before any such recommendations are acted upon, unless the department has granted the subcommittee authority to act on its own recommendations for specific issues.

ACTION: Biological Sciences Department

b) Chair duties: The committee was impressed with the energy and commitment of the retiring Chair and her predecessors, all of whom have done the difficult task with competence and enthusiasm. It is clear from both the documentation and interviews that the Chair requires more release time, and the Review Committee would encourage the department to address this with the Dean of Science. The Review Committee also felt that much of the periodic stress of the Chair's job arose from the need to resolve internal conflict among department members; addressing this conflict should also relieve strain on the chair.

RECOMMENDATION 2(b) (i): The Biological Sciences Department and the Dean of Science should revisit the Chair release issue with a view to increasing the amount of time allocated for Chair duties.

ACTION: Biological Sciences Department; Dean, Science.

RECOMMENDATION 2(b) (ii): The Biological Sciences Department should approach a qualified facilitator to discuss the best method of resolving internal department conflict through facilitation.

ACTION: Biological Sciences Department

3. QUALIFICATIONS FOR TEACHING AND CHAIRING:

Some members of the Biological Sciences Department raised the issue of qualifications for both instructors and the chair; however, it emerged through the interviews that these members understood the term "qualifications" in a narrow way, specifically equating them with a Ph.D. degree. While the achievement of a Ph.D. should not be underestimated, it should not be overestimated either: a Ph.D. is awarded in recognition of a piece of semi-independent, supervised research. It is not a guarantee of either research or teaching excellence. The understanding of some department members seemed to be that "credibility" outside of the institution depended on the number of Ph.D.s in a department or the election of a Ph.D. as chair, though no one questioned any particular chair's performance. The Review Committee points out that external academic credibility is established through the accomplishments of faculty and the department as a whole, particularly during evaluation exercises such as this review.

The Committee also determined that not all department members were able to participate to their full potential in teaching and research within the department. The argument that the Biological Sciences Department requires more faculty will only become compelling when the department has demonstrated that its manpower resources are being used to their maximum capacity, keeping in mind that UCC is not a research-based, graduate institution with graduate students available for teaching and research assistance. Credibility at an undergraduate, teaching-centered institution emerges not only from research but also significantly through teaching, service and, above all, a sense of community. This latter value was noted and much appreciated by the students, who commented frequently on small class sizes and, as one student put it, the "closeness of the students and faculty." Department members, however, do not always share this sense of closeness among themselves, partly because some department members feel that they are being denied opportunities to give more to the department, so that they can be accepted as colleagues rather than as assistants: given the limited financial resources currently available, it seems short-sighted not to maximize the use of human resources which are clearly available.

RECOMMENDATION 3(a): All department members, including lab demonstrators, should be considered in course allocation, particularly at the first-year level, based on qualifications, expertise, and experience.

ACTION: Chair, Biological Sciences Department

RECOMMENDATION 3(b): All department members should remain eligible for the position of chair.

ACTION: Biological Sciences Department

4. COURSE SHORTAGES:

Both students and department members noted the lack of course variety in the Biological Sciences Program, particularly in third and fourth year. The Committee, however, feels that the solution is not simply more faculty appointments. For one thing, the Committee was alerted to the fact that whereas all other Arts and Science majors (English, History, Geography, Sociology, Psychology, Chemistry, Physics) offer upper level courses in two-year rotations, Biological Sciences currently does not make course rotation a standard practice. It also noted over the last three years, the Biological Sciences Department has offered an average of 22 upper level semester courses per year; the average upper level student takes 10 courses per year. Rotation of upper level courses would provide more variety over a two-year span, and would also periodically free up faculty for re-assignment to the enrolment pressure points at first and second year level.

In scanning the course listings in the UCC calendar, the Committee also noted a preponderance of pre- and co-requisites to upper level Biological Sciences courses which appear only to enforce a certain level of subject maturity; this hinders both student access and flexibility of scheduling.

RECOMMENDATION 4(a): The Biological Sciences Department should determine which upper-level courses might be rotated and implement a rotation schedule; faculty workload plan should be prepared two years in advance, to allow student planning and to allow faculty adequate time for new course preparation.

ACTION: Chair and faculty, Biological Sciences Department

RECOMMENDATION 4 (b): The Biological Sciences Department should undertake a review of the pre-requisite and co-requisite system currently in place, and consider the necessity and value of designating upper-level courses as prerequisites.

ACTION: Biological Sciences Department

RECOMMENDATION 4(c): The Biological Sciences Department should explore expanded cross-listings with the Natural Resource Science Program.

ACTION: Biological Sciences Department

RECOMMENDATION 4(d): The Biological Sciences Department should continue to grant students the option of taking one or two semesters at other institutions as a means of accessing upper-level courses not offered at UCC. The department should continue to allow students to consider other BCUCs, in addition to research-based universities, for such an option.

ACTION: Biological Sciences Department

RECOMMENDATION 4(e): The Biological Sciences Department should determine if there is a real need for an Honours program, particularly as other institutions contemplate dismantling Honours programs in favour of interdisciplinary studies.

ACTION: Biological Sciences Department

RECOMMENDATION 4(f): The Biological Sciences Department should expand upper-level summer school offerings, including research or field-based courses; these courses need not be taught by current instructional faculty, but might be taught by visiting faculty, graduate students or department members who do not currently teach them. Adequate advance workload planning will provide appropriate search and preparation time for instructors.

ACTION: Biological Sciences Department

RECOMMENDATION 4(g): When recommendations 3 and 4(a)-(f) have been implemented, if there is still a demonstrable need for more faculty, the department should seek resources to hire an additional faculty member in one of the following areas, as determined by its five-year plan: Cell Biology and Genetics; or Microbiology; or Plant Biology; or Biological collections curation.

ACTION: Biological Sciences Department

5. RESOURCES:

a) Library: Both students and faculty expressed frustration with the lack of journals in the library; it should be noted, however, that the library currently spends \$150,000 on journals and \$50,000 on stacks annually, so the potential for shifting additional resources to journals is extremely limited. However, the change in relationship between the Library and the instructional departments, signalled by the recent Library Review, may open the door to more faculty input into journal acquisitions.

RECOMMENDATION 5(a): The Biological Sciences Department should work to create a better liaison with the Director, Library and Information Systems, and the librarians, with a view to achieving a more flexible policy on journal acquisition.

ACTION: Biological Sciences Department

b) Lab facilities: The Review Committee fully supports the Biological Sciences Department's request for more lab space for research and instruction. The Science Building was designed prior to the existence of the Natural Resource Science Program, which has since taken lab and classroom space in the building, thus "elbowing out" Biological Sciences to an extent (in the words of one department member). As far as instructional and storage space is concerned, some relief may occur with conversion of S172 into a dry lab, but no major change is foreseen until the construction of the new Library in 2004 and the conversion of the old one to teaching space. However, now that research activity is recognized in the UCC Strategic Plan as a legitimate institutional priority, and now that the BCUC Consortium is advocating government funding for research in the university colleges, the Biological Sciences Department may find that arguments for faculty and student research space are entertained more favourably.

RECOMMENDATION 5(b) (i): The Dean, Science, and the Vice-President, Administration and Finance, should seize interim opportunities to increase lab space for instruction until the conversion of the old Library space to teaching space in 2004.

ACTION: Dean, Science; Vice-President, Administration and Finance

RECOMMENDATION 5(b) (ii): The Biological Sciences Department must continue to press for UCC relationships with corporate and government sponsors to develop joint research facilities with dedicated space for UCC faculty. The department should also work with the UCC Foundation about creating endowment funds for research facilities.

ACTION: Biological Sciences Department; UCC Foundation

c) Health and Safety: The Committee was told that some of the Science labs have ventilation and fume hood problems which are in violation of WCB regulations.

RECOMMENDATION 5(c): The Director, Facilities, make correction of lab ventilation problems in the Science Building an immediate priority, as per the UCC Five-year Capital Plan, 2000-2005.

ACTION: Director, Facilities

d) Computers: Lab demonstrators currently write lab manuals and do other department work without adequate computer support. Some are still making do with 386s. Instructors complain that they, too, have to work with outdated computers.

RECOMMENDATION 5(d): All department members should be encouraged request computers appropriate to their work, and the Chair should press these requests with the Dean of Science.

ACTION: Chair, Biological Sciences Department

6. LABOUR RELATIONS

Student research opportunities are being badly undermined by CUPE's refusal to recognize student research fellowships as having a status different than student jobs. This situation is unacceptable.

RECOMMENDATION 6 (a): The UCC Executive and the Director, Human Resources, must seek a speedy resolution to CUPE obstruction of the allocation of Federal research grant monies to UCC students.

ACTION: UCC Executive; Director, Human Resources

7. ADVISING AND TRANSFER ARRANGEMENTS:

Although the students were satisfied in general with upper level advising, they were much less positive about entry-level academic advising for the Sciences. As one student succinctly put it: "Academic advising—forget it!"

RECOMMENDATION 7(a): The B.Sc. Advisor should endeavour to develop better co-ordination and communication between Science programs and the Academic Advising Department.

ACTION: B.Sc. Advisor

RECOMMENDATION 7(b): The Academic Advising Department should endeavour to keep abreast of transfer arrangements for Biological Sciences.

ACTION: Academic Advising Department

8. TEACHING:

a) Evaluations: Though faculty felt that they were adequately evaluated, students wanted more opportunities to evaluate both instructors and courses in a formative context to give direction to course planning and improvement.

RECOMMENDATION 8(a): The Chair, Biological Sciences, should continue to administer formative evaluations and the faculty should continue to administer the course evaluations recently developed by their Department.

ACTION: Chair, Biological Sciences; Biological Sciences faculty

b) Teaching innovation/methodology: Comments from students indicated a lack of variety in instructional delivery among some instructors. They report that too much material is being delivered in unmediated lecture format, particularly in the large lower level classes. Apart from class size, dependence on sessional faculty, particularly at second year level, may be a factor; regularization of faculty may improve the situation.

RECOMMENDATION 8 (b): The Biological Sciences Department as a group should continue to discuss teaching innovations and the use of technologies in the classroom. Faculty should also be encouraged to attend Instructional Skills Workshops.

ACTION: Chair and Faculty, Biological Sciences Department

c) Curricular Emphasis: Students also requested more development of problem-solving skills, practical skills, research skills, oral communication skills and teamwork skills in the curriculum.

RECOMMENDATION 8(c): In constructing their curriculum and delivering their courses, Biological Sciences faculty should continue to develop problem-solving, practical, research, oral communication and team-work skills in their students.

ACTION: Biological Sciences faculty

d) Evaluation/ grading: Some students (especially at second year level) expressed doubts about the efficacy of exam-based evaluation. Pedagogical theory would also question the long-term intellectual retention of students in exam-dependent courses. As well, grades seem high in one or two courses. While there are several reasons for this – sabbatical and sick-leave replacements, workload allocation with insufficient lead-time for preparation, use of sessional faculty as stop-gap substitutes – the Department could mitigate these problems by more mentoring and monitoring.

RECOMMENDATION 8 (d) (i): The Biological Sciences Department should continue to develop alternatives to exam-based evaluation, specifically to improve long-term retention and basic understanding, and to foster ongoing student interest in Biological Sciences.

ACTION: Biological Sciences Department

RECOMMENDATION 8 (d) (ii): The Biological Sciences Department should annually monitor departmental grade distributions and ensure equitable standards across the department from year to year.

ACTION: Biological Sciences Department

RECOMMENDATION 8 (d) (iii): The Biological Sciences Department should consider introducing a policy of mentoring new, sessional and part-time faculty to ensure that their grading practices fall within department norms.

ACTION: Biological Sciences Department

- e) Course outlines: The Committee noted that there is considerable variation between individual course outlines in the Biological Sciences Department.

RECOMMENDATION 8(e): To enhance their professional appearance, the Chair, Biological Sciences, should ensure that all Biological Sciences course outlines adhere to the standard UCC format.

ACTION: Chair, Biological Sciences

APPENDIX A **METHODOLOGY**

The data were collected in the following ways:

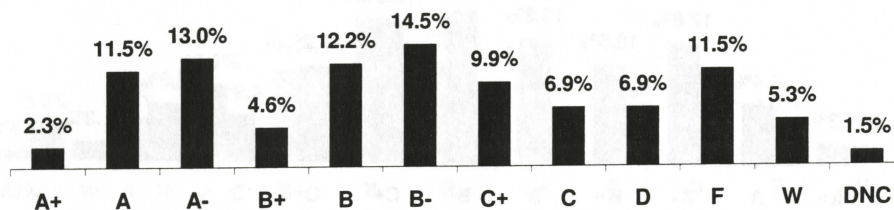
- 1) Consultation took place with the Biological Program Review Steering Committee, consisting of Lyn Jessee, Chairperson, Biological Sciences; Val Collins; Tom Dickinson; Louis Gosselin; Anne Harrison; and Mairi Mackay on the design of the questionnaires.
- 2) Questionnaires were administered to Biological Sciences Program faculty, current students and former students (1996-99). All data were processed using SPSS to achieve frequency rates and mean responses. Subjective comments for each group were recorded separately and anonymously. Additional former student data from 1995-1998 program leavers were extracted from the Student Outcomes Reporting System (SORS), a software reporting tool summarizing data from the BC Colleges and Institutes Student Outcomes Surveys.
- 3) "Descriptive Data" on the Biological Sciences Program's objectives, course outlines, etc., were solicited from Lyn Jessee, Chairperson, Biological Sciences Program.
- 4) Data on annual seat utilization rates, graduation rates, gender and grade distributions were provided by the Office of Institutional Research and Planning.
- 5) The following people associated with the program participated in the review process or were interviewed:

Wayne Babinchuk, President, UCC Faculty Association
Dr. Roger Barnsley, President, UCC
Dr. Valerie Collins, Biological Sciences
Dr. Rufus Day, Research Co-Ordinator, UCC
Dr. Tom Dickinson, Biological Sciences
Carolynne Fardy, Lab Demo, Biological Sciences
Don Ferguson, Lab Demo, Biological Sciences
Nancy Flood, Biological Sciences
Dr. Louis Gosselin, Biological Sciences
Nancy Levesque, Director, Library & Information Systems, UCC
Dr. Mairi Mackay, Biological Sciences
Dr. Shelley Mann, Biological Sciences
Karen Ross, Lab Demo, Biological Sciences
Dr. Ron Smith, Biological Sciences
David Williams, Biological Sciences
Joanna Urban, Lab Demo, Biological Sciences
3rd and 4th Year Biological Sciences Students (4)

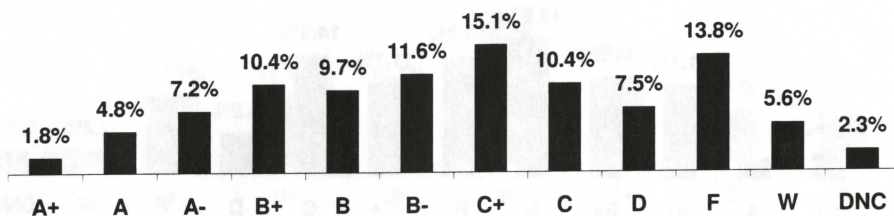
APPENDIX B

GRADE DISTRIBUTIONS: 97/FA – 99/WI³ BY COURSE

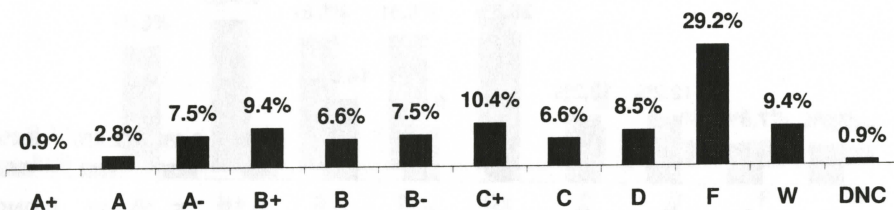
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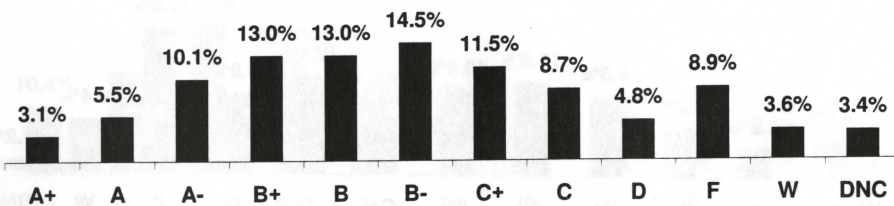
BIOL 111 - PRINCIPLES OF BIOLOGY 1 n=683



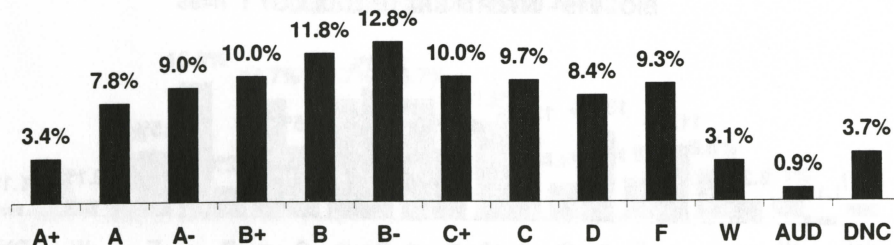
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BIOL 121 - PRINCIPLES OF BIOLOGY 2 n=585



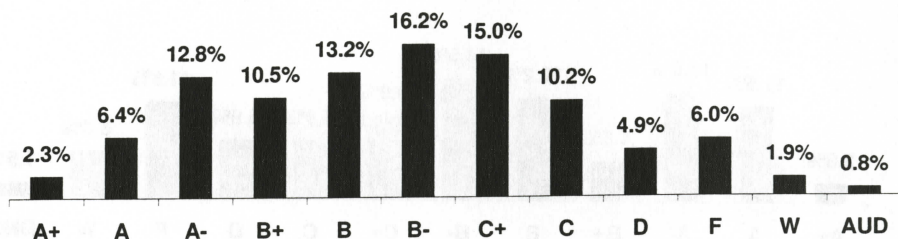
BIOL 159 - HUMAN BIOLOGY: ANATOMY & PHYSIOLOGY 1 n=321



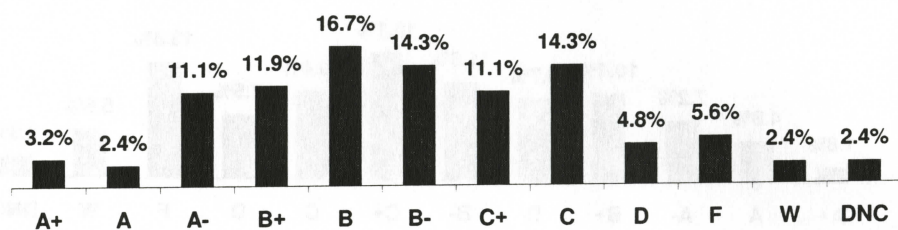
³ Summer Session not included.

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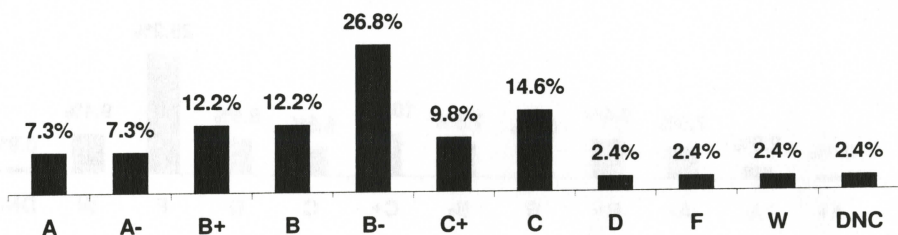
BIOL 169 - HUMAN BIOLOGY: ANATOMY & PHYSIOLOGY 2 n=266



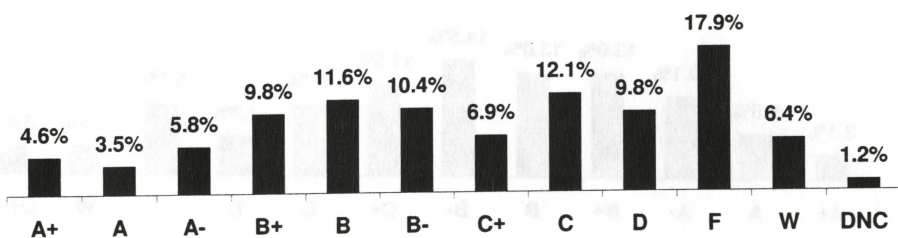
BIOL 210 - INTRODUCTORY MICROBIOLOGY 1 n=126



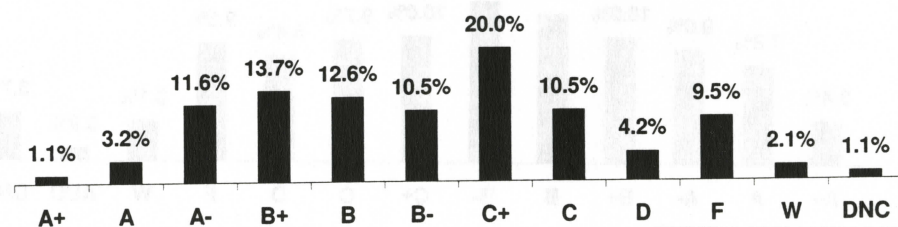
BIOL 211 - NON-VASCULAR PLANTS n=41



BIOL 213 - CELL BIOLOGY n=173

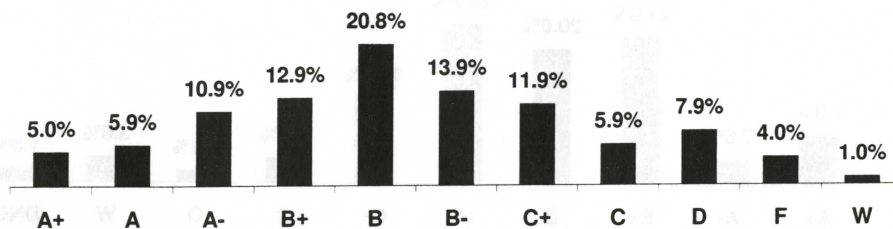


BIOL 215 - INVERTEBRATE ZOOLOGY 1 n=95

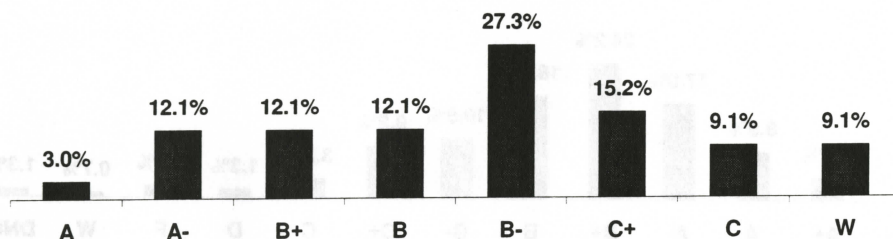


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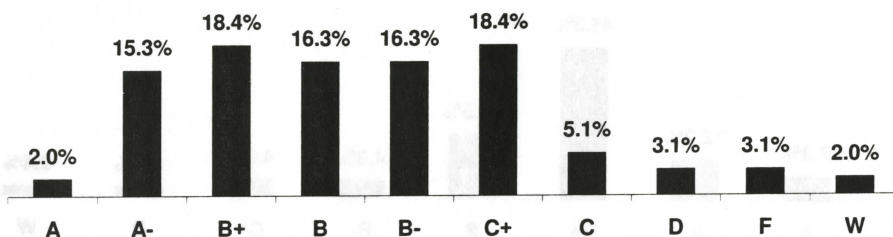
BIOL 220 - INTRODUCTORY MICROBIOLOGY 2 n=101



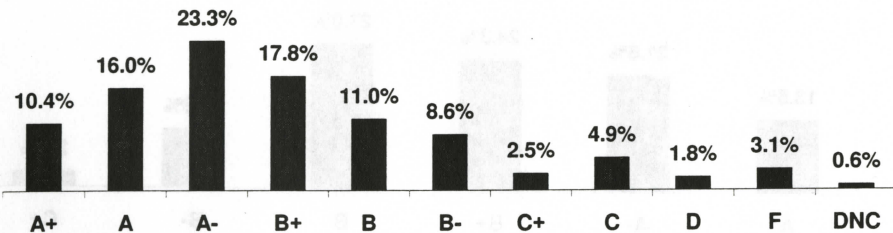
BIOL 221 - VASCULAR PLANTS n=33



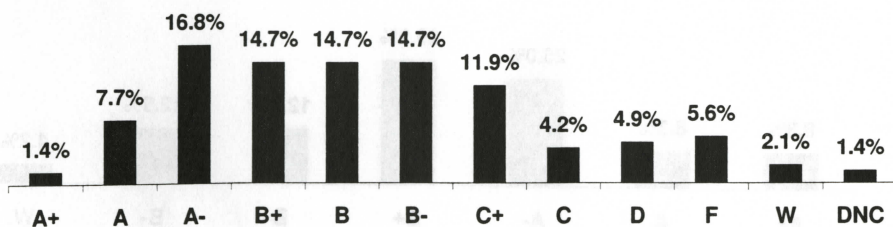
BIOL 225 - VERTEBRATE ZOOLOGY 2 n=98



BIOL 234/334 - INTRODUCTION TO GENETICS n=163

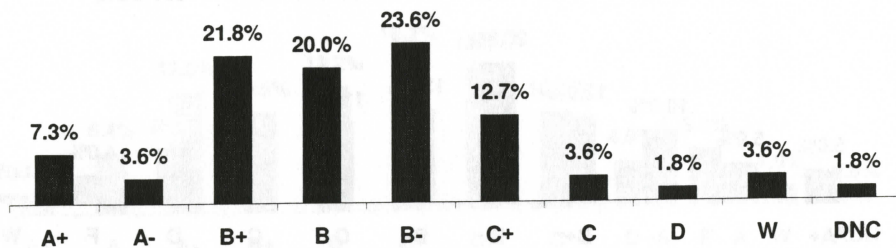


BIOL 300 - BIOMETRICS n=143

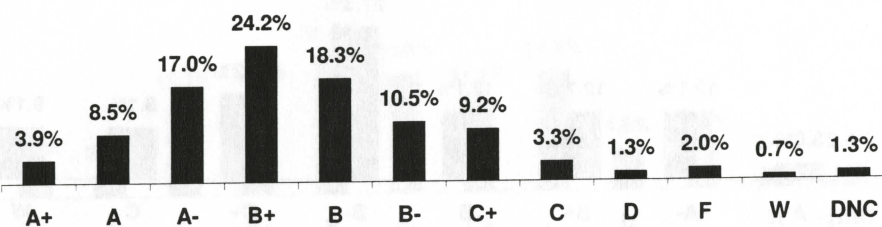


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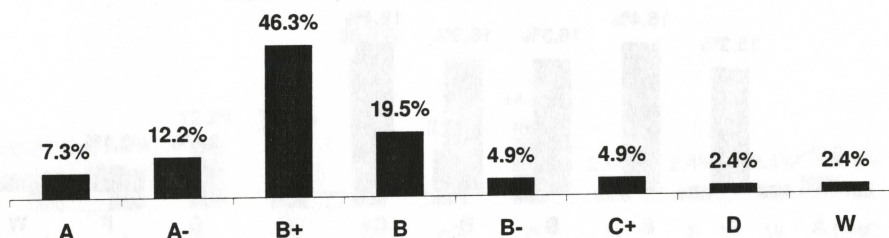
BIOL 302 - COMMUNITY & ECOSYSTEM ECOLOGY n=55



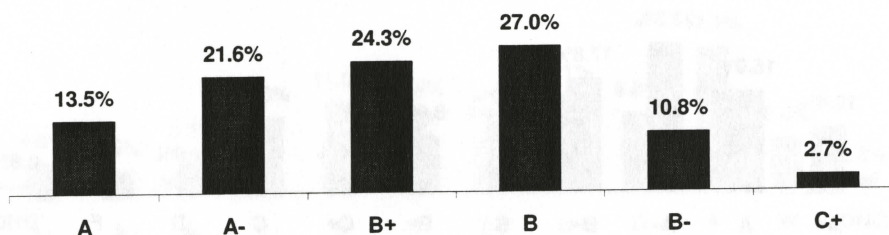
BIOL 303 - POPULATION BIOLOGY n=153



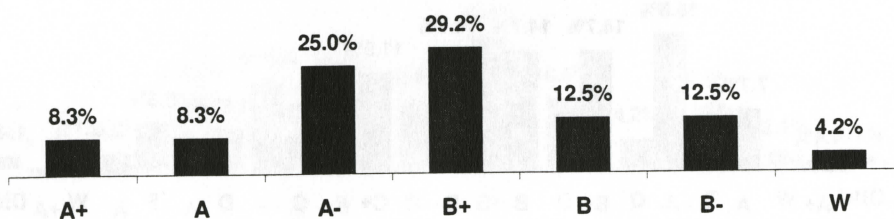
BIOL 310 - INTRODUCTION TO ANIMAL BEHAVIOUR n=41



BIOL 313 - INTRODUCTION TO BIOCHEMISTRY n=37

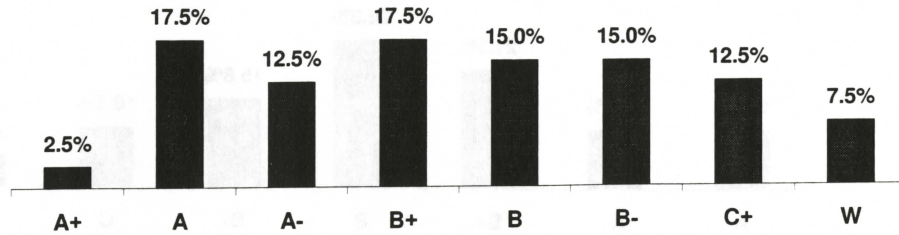


BIOL 320 - BIOCHEMISTRY n=24

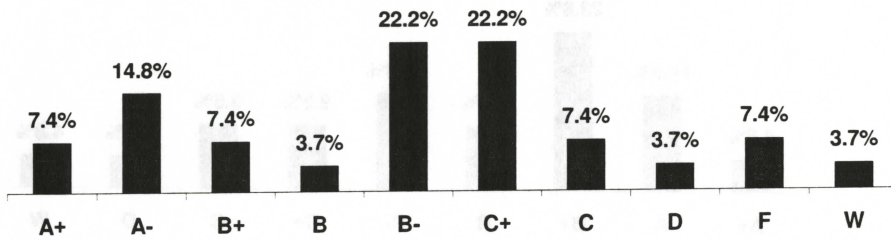


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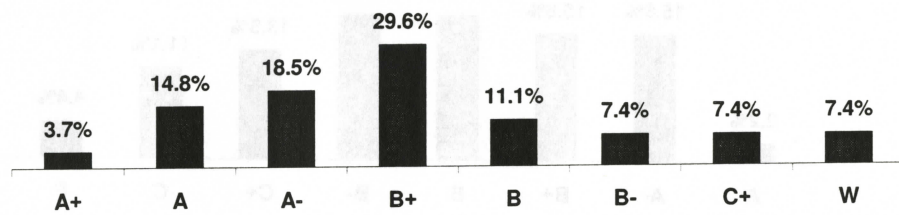
BIOL 323/BIOC 302 - BIOCHEMISTRY n=40



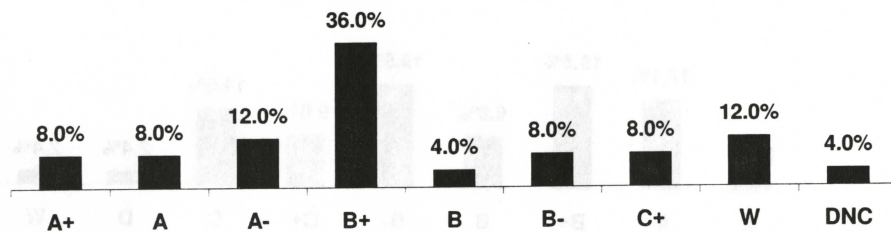
BIOL 324 - THE SYSTEMATICS OF FLOWERING PLANTS n=27



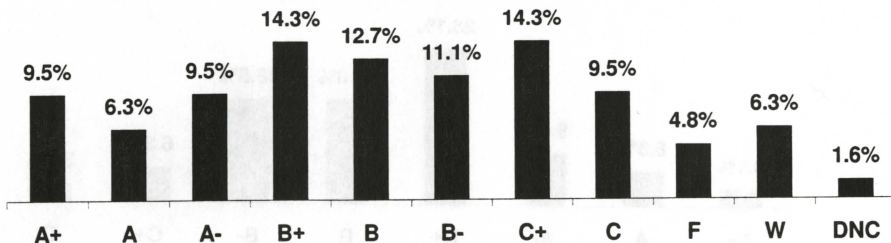
BIOL 329 - ICHTHYOLOGY n=27



BIOL 331 - DEVELOPMENTAL BIOLOGY n=25

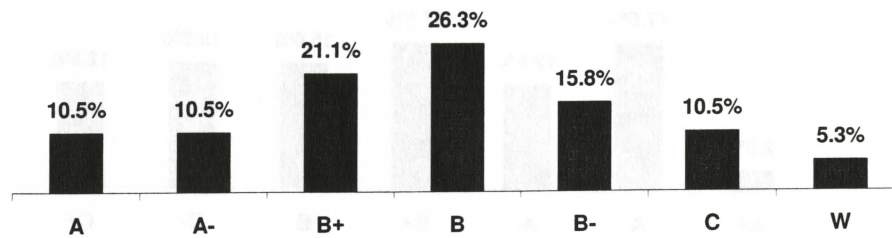


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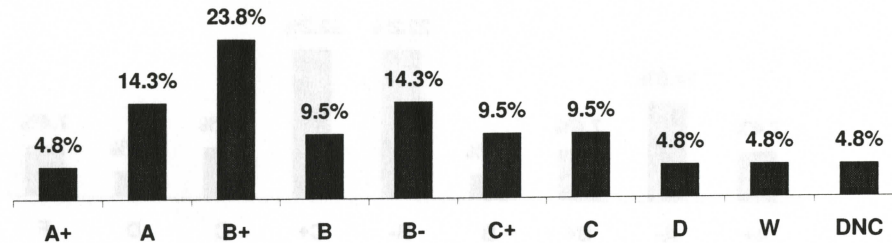


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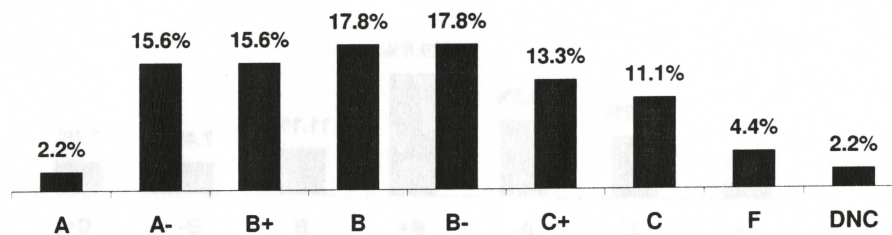
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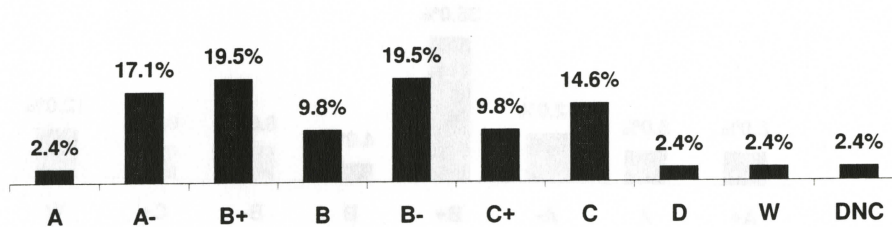
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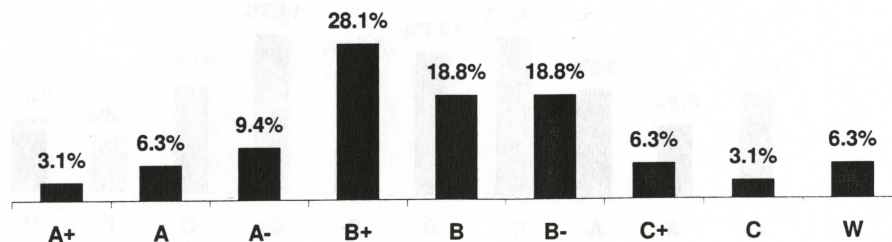
BIOL 354 - VERTEBRATE PHYSIOLOGY 1 n=45



BIOL 355 - VERTEBRATE PHYSIOLOGY 2 n=41

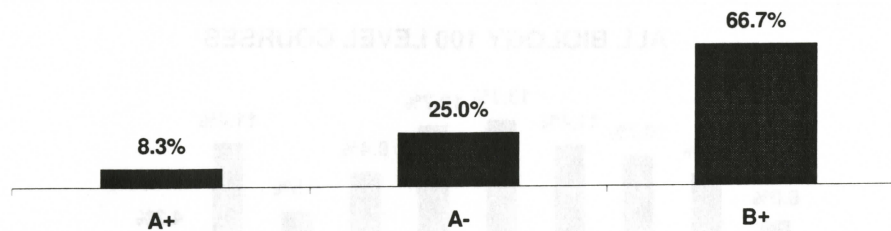


BIOL 402 - LIMNOLOGY n=32

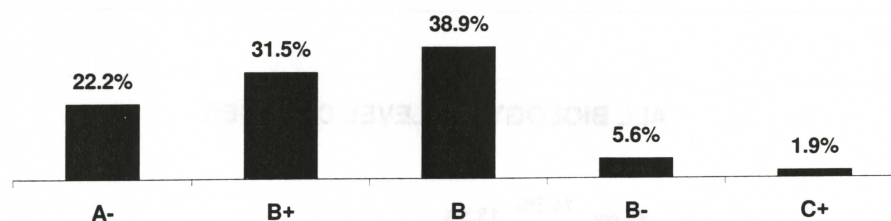


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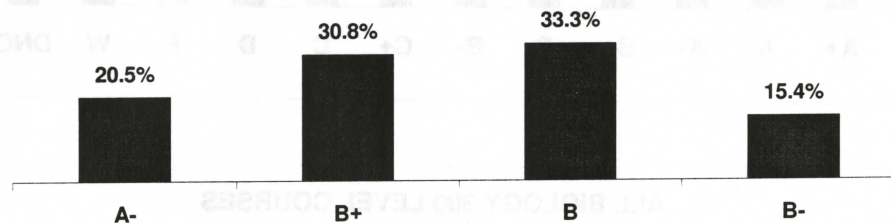
BIOL 409 - FIELD COURSE IN ANIMAL ECOLOGY n=12



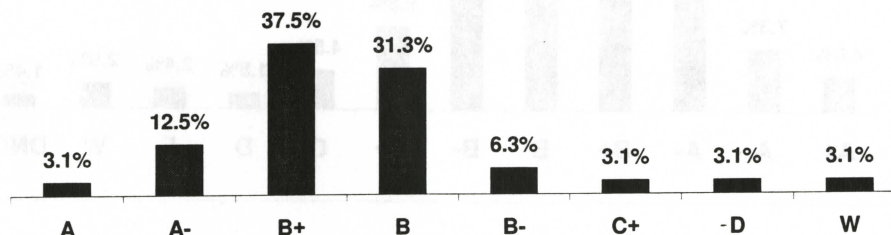
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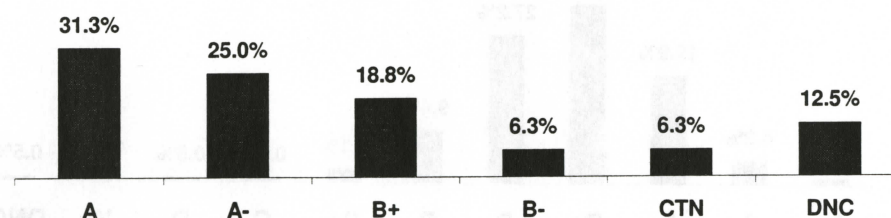
BIOL 416 - PRINCIPLES OF CONSERVATION BIOLOGY n=39



BIOL 427 - TERRESTRIAL VERTEBRATE ZOOLOGY n=32

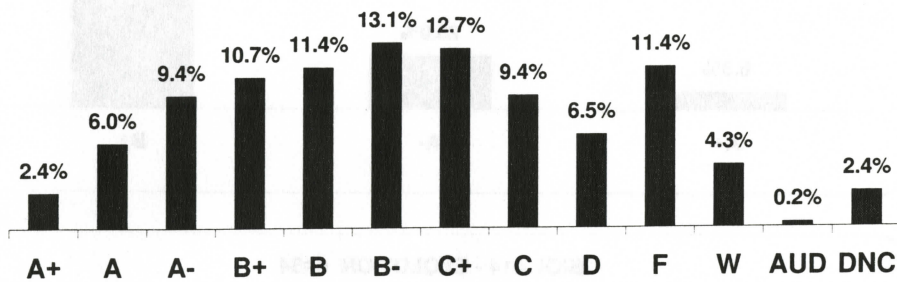


BIOL 448 - DIRECTED STUDIES IN BIOLOGY n=15

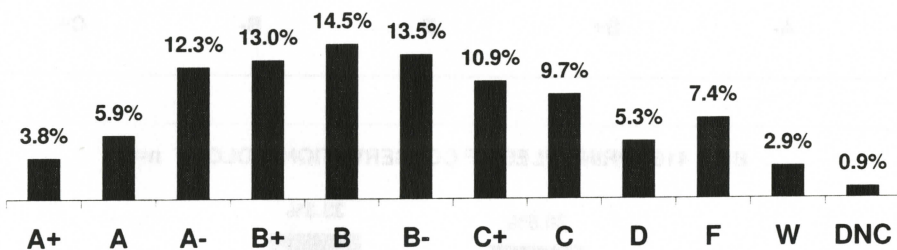


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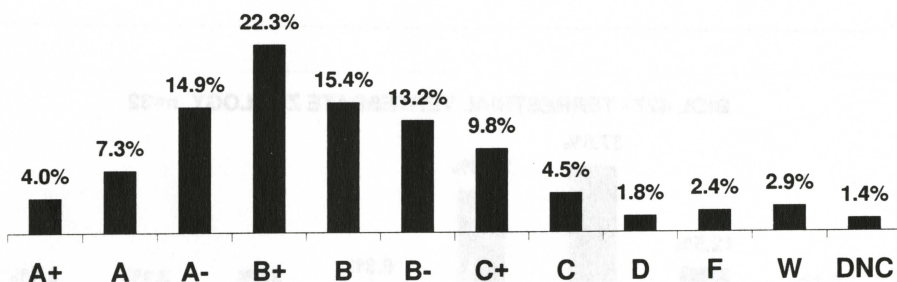
ALL BIOLOGY 100 LEVEL COURSES



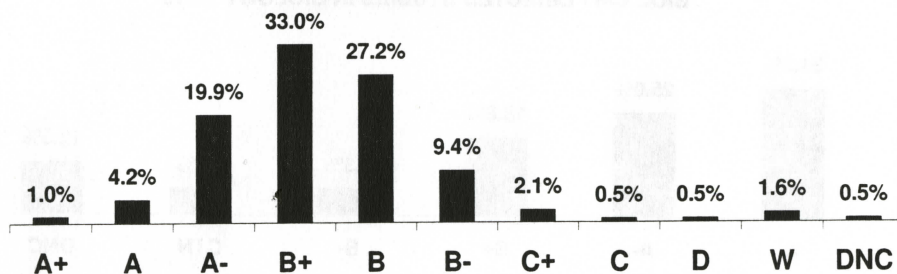
ALL BIOLOGY 200 LEVEL COURSES



ALL BIOLOGY 300 LEVEL COURSES



ALL BIOLOGY 400 LEVEL COURSES



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