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REVIEW REPORT
on the
GEOLOGY PROGRAM

JUNE 2004

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EXECUTIVE SUMMARY

The Review Committee was very favourably impressed with UCC's Geology faculty, in particular with the dedication and resourcefulness of the only full-time instructor. His efforts to build and maintain a Geology curriculum during the past decade are nothing short of laudable. He has successfully put in place and maintained the essential foundation on which a full four years of study in this discipline can be developed – a phase he is ideally qualified to lead. No more could reasonably be expected in terms of demonstrated commitment. Equally outstanding is the commitment of the laboratory instructors. Their frank assessments and constructive suggestions reflect a high level of expertise and strong dedication to teaching. It is obvious too, from responses and comments of those who attend the courses, that the Geology faculty is widely liked, admired and respected. Students are very satisfied with the quality of instruction.

Enrolment statistics indicate strong interest in the study of Geology, even though students desiring to complete a degree in the discipline must do so elsewhere. This enthusiasm is confirmed in numerous comments from former and current students. The Committee also benefited from the valuable insight of the president of the Kamloops Exploration Group (KEG), an association that promotes Geoscience and offers scholarships in this field. He professed astonishment that the discipline is not stronger at UCC, given B.C.'s resource-based economy and Kamloops' situation in the heart of the province's mining industry. The provincial government is stressing employability of graduates, yet particularly within the mining sector there is a shortage of trained geologists. Career possibilities exist; there are jobs available right now for Geology students.

With the basic outlines of a program already in place, the high level of student interest and good prospects for employment upon graduation point to both the viability and desirability of a Geology Minor at UCC. Geology has built interdisciplinary connections. There is existing collaboration with Archaeology in the form of a Geoarchaeology Minor and with Geography in the form of a cross-listed course. There is potential to cross list more courses with Geography and possibly with NRS (Soils) to help establish a Geology Minor program. There is, then, a compelling case for delivery of a Geology program. It is also clear to the Committee, however, that delivery of such a program is contingent upon the addition of a second full-time instructor.

Whether or not UCC wishes to establish a program in this discipline, the Committee feels that Geology might build on its existing strengths by attempting to improve certain areas. An updated web site would help publicise Geology courses. In order to eliminate ambiguity about student input, the Geology faculty should ensure that evaluations are done for all courses on a regular basis. Regular consultation between part-time and full-time faculty would better facilitate collaborative innovation, for example with regard to creation of field trips. While the Committee realises there are funding constraints, it nevertheless sees field trips as integral to most courses in this discipline. Faculty should endeavour, therefore, to integrate some field trips into the courses, even if they are short ones close to, or within, Kamloops. This may involve using some designated laboratory time for field excursion(s) and/or innovations in scheduling to create larger blocks of combined classroom/laboratory/fieldwork time.

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GEOLOGY PROGRAM REVIEW
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CHRONOLOGY OF THE GEOLOGY PROGRAM REVIEW

An initial information meeting with Geology Faculty and Institutional Research and Planning members was held on November 25th, 2003 with Ken Klein, full-time Geology Instructor and Kathryn Dunne, part-time Geology Instructor. Further meetings were held on January 20th and February 26th with Ken Klein to discuss questionnaire content and format. Questionnaires were refined and finalized by February 27th, 2004.

Stakeholders in the Geology Program were surveyed on the following dates:

Former Students (2000-03):	January 29 th , 2004
Faculty:	February 27 th , 2004
Current Students (Yrs. 2, 3 & 4):	February 27 th , and March 1 st , 2004

Reminders were mailed to non-responding former students on February 19th. Most faculty members had responded by March 18th. The Office of Institutional Research attempted to contact non-responding former students by phone on March 4th, March 5th and March 9th, 2004 .

The cut-off date for all responses was April 1st, 2004. Information binders were sent to members of the Geology Program Review Committee on April, 6th 2004, and that committee met to analyze the data and form its recommendations on April 22nd and 23rd, 2004.

PROGRAM BACKGROUND AND CONTEXT

Geology was one of the first Science courses to be offered by Cariboo College in 1970. The initial offerings centered on a Mining Technology Program – essentially the first year of the program with the students transferring to BCIT for their second year.

Dr. Richard Hughes (now deceased) was the chair of the program which included a committee of local Geologists and Mine Engineers. The initial offerings included Geology 155/165 – Physical and Historical Geology.

Expansion began in the early seventies to include academic sciences at Cariboo College and the Geology program began to expand at the same time. In the years that followed Dr. Hughes implemented a full first and second year transfer program including by 1979 some unusual offerings such as Forensic Geology.

Geology suffered immensely in the down turn of the early eighties and was to become reduced to only two first year courses. Dr. Hughes was transferred to the library and ultimately he retired. Sandra Taylor became the next instructor in first year geology for a few years then Dr. Colin James assumed the instruction along with his Associate Dean position. In the fall of 1988 Ken Klein was hired to replace Dr. James in Geology as he became Acting Dean of Science in Paul Egans absence to the Middle East.

The Geology instructional position was part time from 1988 to 1991. The course load consisted of Geology 111 and 121 – Physical and Historical Geology. In the fall of 1989 a new course was developed – Geology 113 – Environmental Geology – launched to test the waters for the new environmental idealisms of the times. The course was run (as an alternative to Geology 111) from the fall of 1989 to 1992. Generally it was found that the Physical Geology course would fill first, then the Environmental – either course could be used as first year science credit. As the course was only being taken as an overflow second choice to Geology 111 – it was not offered after the fall of 1992. Instead Geology 111 increased in capacity.

Also in 1992 (and the winter of 1993) the push to regain second year began with the offering of Geology 210 Mineralogy, Geology 216 Stratigraphy and Geology 226 Sedimentology. In the fall of 1993 Geology 221 Paleontology and Geology 219 Geomorphology were also added to the roster. The 219 course was added to match UBCs switch of their third year Geomorphology to second year. In the winter of 1994 Geology 121 was renumbered and renamed to 205 Geologic Time - again to follow UBCs changes. Also in the winter of 1994 Geology 215 Petrology was offered and taught only once – a part time instructor was found, however the course has not been offered since owing to the high cost of necessary microscopes; Geology 216 and 226 were merged to Geology 229 and Geology 228 Field techniques was implemented.

In 1995 with UBC dropping their second year course in Paleontology, Geology 221 was renumbered to Geology 301 and given transfer credit to UVic as Paleobiology. It was also the last year for Geology 228 - the course number changing to 328 and the course mothballed until a proper field school could be established - since UBC did not want to share their facility. With the sheer number of courses now offered at both the lower and upper level, and still only one instructor it became necessary to start offering them in alternate years. In 1998 UBC decided the big experiment with second year Geomorphology had failed and they returned their course to third year. Geography was approached and it was decided to move our course to third year and cross list it as a Geography course as well - hence Geology/Geography 319 was born. Also in 1998 Geology and Archaeology got together and proposed a joint minor. This was approved by the Ministry of Advanced Education and implemented in the fall of 1999. It was necessary to implement another upper level course to run this minor and Geology 425 Geologic History of North America was initiated. Along with Geology 448 Directed Studies - initiated years earlier there were now 4 choices at the Upper Level. In 2003 another Upper Level Course was initiated - Geology/Chemistry 303 Environmental Geochemistry - taught by a part time instructor from Salmon Arm.

The complete slate of course offerings now numbers nine with three still on the books. Petrology (215) Field Geology (328) and Structural Geology (307) could be reinstated if suitable faculty were acquired.

	88	89	90	91	92	93	94	95	96	97	98	99	0	1	2	3	4	5																	
	F	W	F	W	F	W	S	F	W	S	F	W	S	F	W	S	F	W	S	F															
111	31	19	38	38	10	40	59	16	55	12	82	15	85	17	94	35	20	75	50	22	75	46	25	75	35	34	72	35	31	62	54	25	78	36	
113		5	16	26		21	Geology 113 was dropped in 1993 and Geology 111 increased in size.																												
121	26	18	40	41	12	50																													
205	121 was renumbered to Geology 205 in 1995						45		43		46		64		39		30	12		28		30		31		23		34							
210	Implemented in 1992.						19	5		6		14		12		11																			
215	Offered once in 1994.						7																												
216	Implemented in 1993.						18																												
226	Implemented in 1993.						9																												
229	Geology 219 & 226 combined into 229 in 1996						6	9		13		12		10		10																			
228	Implemented in 1994.						8	6																											
328	Geology 228 renumbered to Geology 328 in 1996.																																		
221	Implemented in 1993.						10	6																											
301	Geology 221 renumbered to Geology 301 in 1995.						8	11		11	5		11		12																				
219	Implemented in 1993.						11	10		13	14	13																							
319	Geology 219 renumbered to Geology 319 and cross listed as Geography 319 in 1999.											19	19	18		22	29																		
303	Implemented in 2003.																					4	4												
307	Not yet offered.																																		
425	Implemented in 1999.																					10	7					13							
448	Implemented in 1997.																					1					1	1	1						
	88	89	90	91	92	93	94	95	96	97	98	99	0	1	2	3	4	5																	
	F	W	F	W	F	W	S	F	W	S	F	W	S	F	W	S	F	W	S	F															

☒ Courses currently Offered.

☐ Courses offered in 2004/2005.

MINOR REQUIREMENTS

A Cross Disciplinary Minor in Archaeology and Geology (Geoarchaeology) is available to students in the B.Sc. program and the B.A. program

A minor in Archaeology and Geology must include:

- 1) 3 credits in first or second year Archaeology from; ANTH 111 or ANTH 119 or ANTH 219
- 2) 9 credits in third and fourth year Archaeology from; ANTH 305, ANTH 306, ANTH 326, ANTH 411, ANTH 420, ANTH 433
- 3) GEOL 111 or GEOG 112
- 4) GEOL 205 or BIOL 121
- 5) 9 credits in third and fourth year Geology from; GEOL 301, GEOL 303, GEOL 319, GEOL 425, GEOL 448

GEOLOGY SEAT UTILIZATION

The seat utilization percentage is a measure of the total number of seats occupied in the courses in the program compared to the total seat capacity. Figures include Williams Lake seat capacity and enrolments.

The following takes into account the stable enrolment and capacity from Fall 1999 to Winter 2004. The first two tables give the fall and winter semester Geology figures by year, and the next 10 tables show the comparison with other similar disciplines (Academic programs only) from Fall 1999 to Winter 2004.

Fall Semester

Year	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
1999	98	100	98%	13	40	33%	111	140	79%
2000	99	100	99%	20	29	69%	119	129	92%
2001	90	98	92%	13	43	30%	103	141	73%
2002	64	60	107%	19	26	73%	83	86	97%
2003	81	80	101%	9	9	100%	90	89	101%

Winter Semester

Year	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
2000	87	100	87%	11	10	110%	98	110	89%
2001	83	100	83%	1	1	100%	84	101	83%
2002	76	80	95%	0	0	0%	76	80	95%
2003	102	120	85%	1	6	17%	103	126	82%
2004	74	86	86%	14	10	140%	88	96	92%

Comparison With Other Science Disciplines (Academic Programs Only) For The Same Period

Fall 1999

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	98	100	98%	13	40	33%	111	140	79%
CHEM	476	504	94%	115	142	81%	591	646	91%
PHYS	400	431	93%	18	44	41%	418	475	88%
BIOL	890	804	111%	275	308	89%	1165	1112	105%

Winter 2000

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	87	100	87%	11	10	110%	98	110	89%
CHEM	362	477	76%	87	146	60%	449	623	72%
PHYS	313	388	81%	18	27	67%	331	415	80%
BIOL	723	909	80%	269	260	103%	992	1169	85%

Fall 2000

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	99	100	99%	20	29	69%	119	129	92%
CHEM	468	523	89%	176	193	91%	644	716	90%
PHYS	377	419	90%	27	42	64%	404	461	88%
BIOL	824	864	95%	295	318	93%	1119	1182	95%

Winter 2001

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	83	100	83%	1	1	100%	84	101	83%
CHEM	344	436	79%	114	151	75%	458	587	78%
PHYS	226	296	76%	16	26	62%	242	322	75%
BIOL	731	845	87%	260	281	93%	991	1126	88%

Fall 2001

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	90	98	92%	13	43	30%	103	141	73%
CHEM	508	543	94%	149	185	81%	657	728	90%
PHYS	408	452	90%	43	59	73%	451	511	88%
BIOL	844	828	102%	343	370	93%	1187	1198	99%

Winter 2002

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	76	80	95%	0	0	0%	76	80	95%
CHEM	455	364	125%	101	152	66%	556	516	108%
PHYS	346	403	86%	18	26	69%	364	429	85%
BIOL	719	758	95%	325	311	105%	1044	1069	98%

Fall 2002

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	64	60	107%	19	26	73%	83	86	97%
CHEM	550	576	95%	115	139	83%	665	715	93%
PHYS	384	456	84%	37	46	80%	421	502	84%
BIOL	881	874	101%	390	400	98%	1271	1274	100%

Winter 2003

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	102	120	85%	1	6	17%	103	126	82%
CHEM	421	500	84%	126	168	75%	547	668	82%
PHYS	297	409	73%	35	45	78%	332	454	73%
BIOL	714	789	90%	343	341	101%	1057	1130	94%

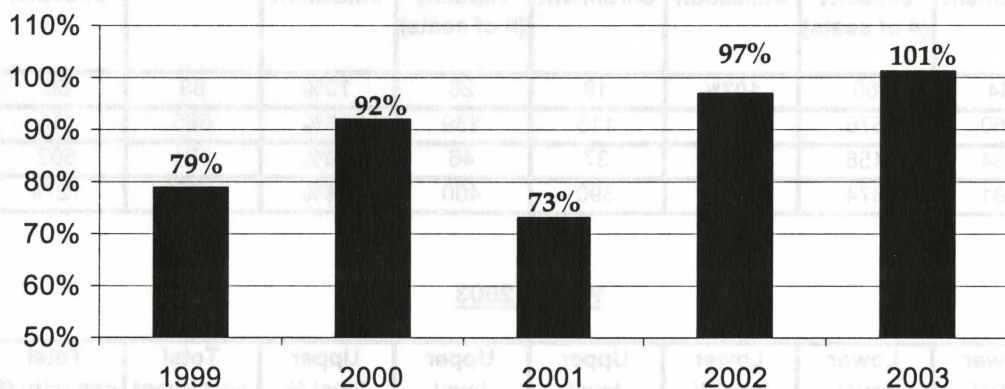
Fall 2003

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	81	80	101%	9	9	100%	90	89	101%
CHEM	545	576	95%	150	208	72%	695	784	89%
PHYS	368	408	90%	30	46	65%	398	454	88%
BIOL	919	907	101%	418	432	97%	1337	1339	100%

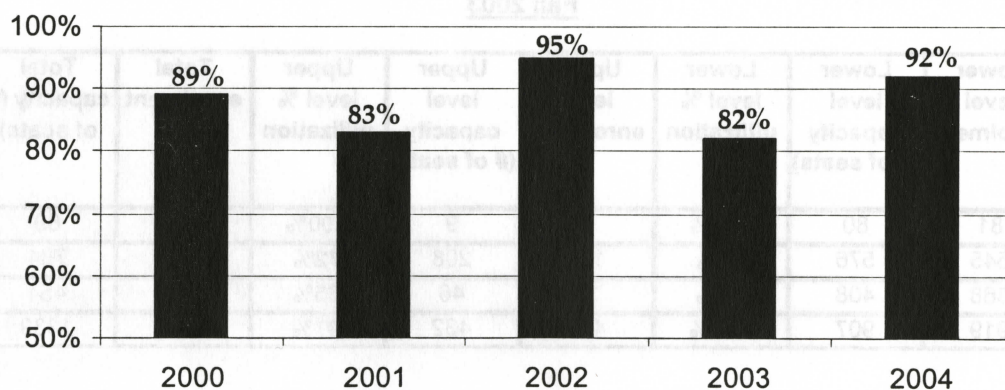
Winter 2004

Discipline	Lower level enrolment	Lower level capacity (# of seats)	Lower level % utilization	Upper level enrolment	Upper level capacity (# of seats)	Upper level % utilization	Total enrolment	Total capacity (# of seats)	Total % utilization
GEOL	74	86	86%	14	10	140%	88	96	92%
CHEM	394	504	78%	137	198	69%	531	702	76%
PHYS	277	391	71%	18	26	69%	295	417	71%
BIOL	765	826	93%	367	383	96%	1132	1209	94%

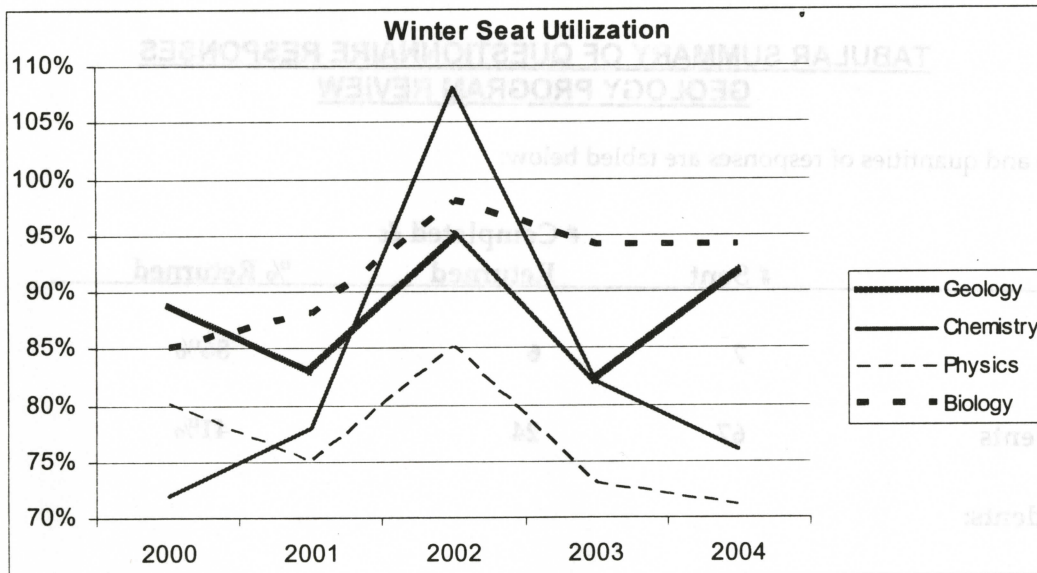
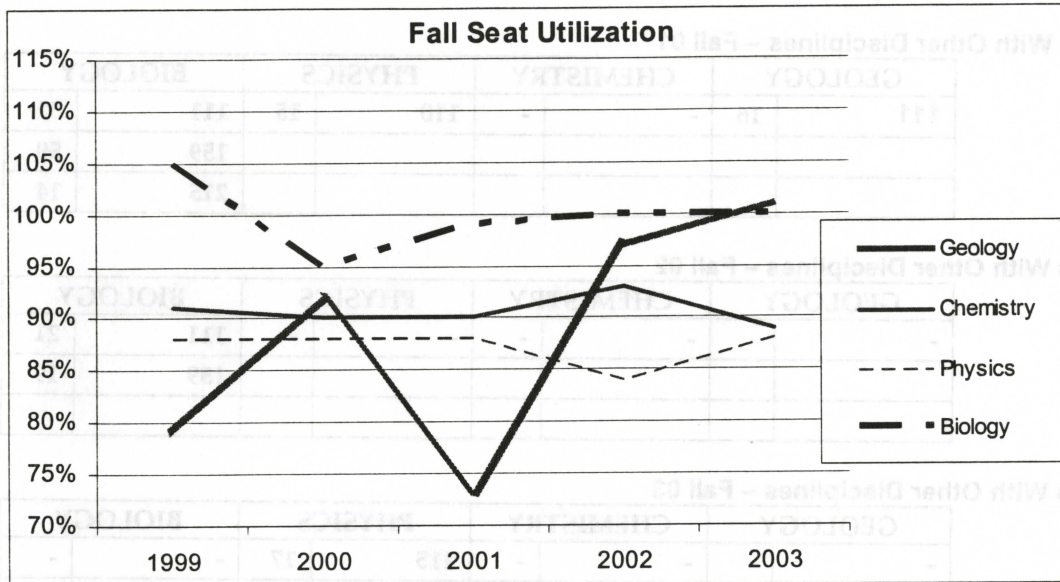
Geology Fall Seat Utilization



Geology Winter Seat Utilization



Seat Utilization Comparison With Other Disciplines



COURSE WAIT LISTS

(Source: Fall 01, Fall 02, Fall 03 – Stable Enrolment Data)

*Only those courses with waitlist of 14 or greater are included in the comparison figures.

Comparisons With Other Disciplines – Fall 01

GEOLOGY		CHEMISTRY		PHYSICS		BIOLOGY	
111	16	-	-	110	15	111	31
						159	59
						215	14

Comparisons With Other Disciplines – Fall 02

GEOLOGY		CHEMISTRY		PHYSICS		BIOLOGY	
-	-	-	-	-	-	111	21
						159	19

Comparisons With Other Disciplines – Fall 03

GEOLOGY		CHEMISTRY		PHYSICS		BIOLOGY	
-	-	-	-	115	17	-	-

TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES GEOLOGY PROGRAM REVIEW

The categories and quantities of responses are tabled below:

Recipient	# Sent	# Completed & Returned	% Returned
Faculty	7	6	86%
Former Students	67	24	41%
Current Students:			
2nd yr.	35	26	74%
3rd & 4th yrs.	27	14	52%
TOTAL	136	70	55%

*(Note: The number of returned envelopes is subtracted from the number sent to attain the % returned.)

Returned by Post Office:

Former Students = 9

Total Non-Respondents: = 37

SUMMARY OF QUESTIONNAIRE RESPONSES

Questions pertaining to **Program Organisation and Delivery** utilised a scale from 1 to 5 (1 = "strongly disagree", 2 = "disagree", 3 = "neutral", 4 = "agree", 5 = "strongly agree"). Questions pertaining to **Student Skills and Abilities** also utilised a scale from 1 to 5 (1 = "to no extent", 2 = "to a minimal extent", 3 = "to a limited extent", 4 = "to a moderate extent", 5 = "to a great extent"). In analysing the questionnaire responses the Geology Review Committee used the following criteria for most answers: ratings of 4.00 or above were considered excellent; 3.50 – 3.99 good; 3.00 – 3.49 satisfactory, ratings below 3.00 were considered cause for concern. However, some questions were put in such a way that very low ratings have no truly negative connotations. These are duly pointed out below. In summarising subjective data, the Committee has only identified issues where there were several comments of a common theme.

1. Former Students:

Twenty-four students answered the questionnaire: eighteen females and six males. Two thirds of them are in the 18-24 age group. Twenty-two students (91.7%) had not (yet) completed a degree at UCC. Eleven are (still) full-time students, while another nine are employed but continuing their studies. This is also mirrored in answers to questions about when they left UCC or transferred to other institutions. Fifteen are still at UCC and four are at UBC. So nineteen (83%) of the "former" students in this coterie are in fact still students.

The scores for **Program Organisation and Delivery** were generally excellent, in the 4.00-5.00 range. Especially good ratings were achieved on questions relating to first-year Geology preparing students for subsequent courses, the value of Geology assignments as learning experiences, and the consistent and fair evaluation of those assignments. In a few instances, however, scores were discernibly low. Asked about regular opportunities to evaluate Geology courses, seven respondents agreed or strongly agreed that they had such opportunities, while another seven indicated they had not. Five respondents were "neutral" on this question, while another five declined to answer. The score (2.95) is low, therefore, though the message is far from clear. A similar ambiguity relates to current Geology offerings. Seven students felt the range of courses was sufficient, five did not, and half the respondents were either neutral or did not answer. Hence, the score of 3.18. Another marginal score (3.06) comes from students being asked whether, in their view, the Geology faculty uses "new technologies" in the classes. Again, two-thirds of the respondents declined to comment or were neutral on this question. Finally, asked if the workload in Geology was too heavy, fifteen (62.5%) of the twenty-four respondents disagreed or strongly disagreed – indicating that they did not feel the workload was too arduous. Fourteen (58.4%) of them, though, did not think it should be more challenging. The resultant scores for these two questions are 2.17 and 2.13.

The students were also asked to what extent their Geology studies had taught them **Skills and Abilities**. The skills were divided into nine categories. "Laboratory techniques" received the highest rating (4.14). However, four other scores were under 3.5: "information searching skills" (3.20), "field techniques" (3.40), "statistical analysis techniques" (3.19), and "oral presentation skills" (2.25). While the score for "information searching skills" indeed reflects a very mixed range of responses, in each of the other three cases at least a third of the students declined to answer. Thus, the sample of responses is really quite small. So far as the level of emphasis that should be placed on the same nine categories of skills, 79.1% of the respondents stressed "field techniques". The lowest score (3.05) went to "oral presentation skills", with 58.4% of respondents indicating that oral skills should be stressed only to a limited or minimal extent or not at all. Evidently, then, many students do not find the absence of emphasis on oral skills (in Geology courses) problematic. Learning and developing these skills seems unimportant to them. Supplementary to the skills and abilities section, respondents were asked some "what if?" questions. A quarter of them said they would have pursued a Geoscience Major at UCC if there had been one, and nine (37.5%) said they would have pursued a Geoscience Minor.

The **Subjective Comments** of former students focus on strengths, limitations, and suggestions for change. They clearly indicate that Geology's greatest strength is quality of instruction. The greatest drawback is the small

selection of courses, which, as several students noted, is keyed to the fact that the discipline has only one full-time instructor. Another concern is the absence of a degree in Geology. Suggestions for improvement ranged from appointing additional instructors and offering more courses to the creation of a Geology Major.

2. Current Students--Second Year

Twenty-six current students answered the questionnaire. Nineteen (73.1%) of them are in their first or second year of studies at UCC, the rest in their third or fourth years. In total there were fifteen male and eleven female respondents. Most (84.6%) are between the ages of 18 and 24, and almost all of them (25 of 26) anticipate finishing a degree either in science, arts, or education. Twenty-two of these students will have completed Geology 205 by April 2004.

This coterie generally gave **Program Organisation and Delivery** high evaluations, with strong positive agreement on the quality of instruction, fair assessment of assignments, and the extent to which first-year Geology paves the way for subsequent courses. The question of whether upper-level Geology courses build on understanding achieved in lower-level courses was not answered by eight of the respondents, presumably because few in their first or second years would have an informed opinion. Of the eighteen who did answer, sixteen agreed or strongly agreed that upper-level courses did build on previously acquired knowledge. A rating of 3.05 for course evaluation opportunities reflects a split very like the one in the "former student" coterie. Current students are apparently also content with their Geology workload: twelve do not rate it as too heavy and thirteen are "neutral". Likewise, eleven do not feel it should be more challenging and twelve are "neutral" in this regard. Other ratings hovering around 3.00 relate to the use of "new technologies" in the classroom and to Library resources, specifically book holdings and journal/article databases – indicating a full range of opinions.

These respondents were also asked to what extent their Geology studies at UCC had taught them **Skills and Abilities**. Skills were divided into nine categories. Rated highest (4.00) was the category "independent research skills". Since it is not possible for students in their first or second years to have taken a great many Geology courses, it is not surprising to find some rather low scores here as well: "field techniques" (2.78), "statistical analysis techniques" (2.86), and "oral presentation skills" (1.95). Turning to the level of emphasis that should be placed on skill development, eight of the nine categories received scores ranging from 3.35 to 4.08. For the most part these students believe that Geology courses ought to teach a number of skills, but there is one glaring exception: oral presentation. Here again, a score of only 2.79 suggests that the students attach little importance to their own ability to articulate ideas orally and do not consider development of the attendant skills to be worthwhile. Ten (38.5%) of these respondents said they would have pursued a Geoscience Major at UCC if there had been one, and fifteen (57.5%) indicated they would have pursued a Geoscience Minor.

From the **Subjective Comments** it is clear once again that the "excellent" faculty is Geology's greatest strength. Its principal limitations are the absence of field trips and the small number of course offerings. These concerns correlate directly with two recurring suggestions for improving Geology: more courses should be offered and there should be more course-related opportunities for fieldwork.

3. Current Students--Third & Fourth Years:

This coterie consists of fourteen students in total, all but one of them in third or fourth year at UCC. There are nine females and five males in this group, and twelve (85.7%) are in the 18-24 age group. Seven (50%) of these students expect to earn a B.Sc. and another six (42.9%) anticipate finishing a B.A. Five are Geography Majors and five indicate they are pursuing a Minor in Geology/Archaeology. Despite the absence of a Geoscience degree at UCC, by April 2004 thirteen of these respondents will have completed Geology 111 and Geology 448.

Evaluations of **Program Organisation and Delivery** are generally very favourable. There is unanimous agreement that first-year Geology prepares students for subsequent courses. Ten respondents (71.5%) also agree that upper-level courses build on lower-levels courses. This is worthy of note, since this group of experienced students is much better able to comment on the question than students in first or second year. The current range of Geology courses at UCC is given a rating of 3.29, with six respondents (42.8%) indicating that the selection is

sufficient and five (35.7%) remaining “neutral” on this question. The students are evenly split on whether they have had regular opportunities to evaluate the courses. Likewise, there is no consensus regarding the faculty’s use of “new technologies”. This is reflected in a rating of 3.16: five students “agree” that faculty uses them, but just as many disagree. There is no indication of how familiar these students are with (unnamed) technologies that could be applied to classroom instruction in Geology. Do these students think their Geology workload is too heavy? The very low score of 2.21 would suggest not - while only one of the fourteen respondents thinks the Geology workload should be more challenging. With regard to the Library and databases, scores of 3.00 and 3.07 indicate that some students, though by no means all, feel that the resources are deficient.

The highest rating for the **Skills and Abilities** taught in Geology courses was 4.14 for “written communication skills”. All of the remaining eight categories had satisfactory ratings ranging from 3.17 to 3.69. An equally consistent array of mean scores – from 3.43 to 4.29 – indicates that emphasis should be placed on all skill development categories, even though three respondents rejected emphasis on “information searching skills”. “Oral presentation” fares better here, with a rating of 3.71 – suggesting perhaps, that oral expression is much more an accepted part of upper-level Geology courses. The strongest rating of all (4.29), however, calls for emphasis on “field techniques”. Half of the students in this group said they would have pursued a Geoscience Major at UCC if there had been one. Eleven (78.6%) said they would have pursued a Geoscience Minor.

The **Subjective Comments** address Geology’s strengths and limitations, and also include suggestions for change. Again there is very high praise for the professor and the lab instructors. The main limitations are the small course selection, especially upper-level offerings, and the uncertain availability of courses from year to year. Both of these concerns are linked to the perceived need for more instructors. Five of the fourteen respondents recommended that Geology at UCC be improved with the creation of a Major or Minor in the discipline.

Note: The Geology Review Committee also had the opportunity to speak directly with five students. All saw a need for more geology at UCC and more upper-level courses. Two indicated they would have taken Geology as a Minor if it had been possible. Another would have done a Major in Geology rather than History. It was the shared view that an expanded program leading to a Geology Minor would attract substantial numbers of science students. These students seemed largely career-driven, seeing degree credentials as one of the keys to success. Kamloops is home for most of them. They prefer to attend UCC, versus other institutions, and would like to complete their degrees here.

4. **Faculty:**

The Geology faculty consists of one full-time instructor and five other part-time instructors or laboratory instructors.

Ratings of 4.33 and 2.60 pertaining to **Program Structure and Curriculum** indicate agreement among the respondents that Geology courses follow a logical sequence from first to second year, but no consensus about subsequent continuation of the sequence. The curriculum is not flexible enough (2.40) to respond to current (unidentified) trends in the field. A score of 1.33 is indicative of a consensus that the current range of Geology courses is not sufficiently broad. Half of the respondents think students have regular opportunities to evaluate Geology courses, while the other three are “neutral”.

In fourteen categories that attempt to measure the quality of the **Learning Process** evaluations are very high, from 3.80 to 4.83. They are much lower in categories pertaining to **Resources**, although in several sections on Library resources the majority of respondents had “no comment”. However, all responded to the question on laboratory facilities, six agreeing that they are adequate and two disagreeing. There was very mixed response (2.60) to the question of whether supplies, materials, and space are sufficient to maintain an effective program. Another split is apparent with regard to **Faculty Resources**, specifically the effective utilisation of expertise and knowledge. Three respondents indicate that professional expertise is used effectively, but two do not. On two other questions in this category, scores of 1.67 and 1.17 leave no room for doubt: the current number of full-time faculty is not sufficient to deliver the existing Geology courses or to increase or enhance the number of courses. Turning to **Articulation and Liaison**, particularly the frequency and productivity of Department meetings, scores of 0.00 to

1.50 indicate that there are no such meetings. However, opinions are split (3.25) on whether there is adequate communication within the Geology group.

With regard to emphasis on **Student Skills and Abilities** it is clear that little or no emphasis is placed on skills other than "General laboratory techniques" (4.17) and "Problem solving techniques" (3.80). None of the other categories are ranked higher than 3.00, with "field techniques" and "statistical analysis techniques" each receiving a low score of 1.83. The respondents were asked to select three skills/abilities they thought deserved more or less emphasis and to rank them in order of importance. The Review Committee assigned a rating of 3.00 for each 1st choice, 2.00 for each 2nd choice, and 1 for each 3rd choice. With a total of fifteen points, by far the category requiring more emphasis is "field techniques". "Oral presentation skills" and "written communication skills" totalled five and six points respectively. Two respondents felt strongly that less emphasis should be placed on "teamwork skills", but otherwise no particular area was singled out.

Subjective comments from the faculty also reiterate the need for field trips, since Geology is a field-based science. The geological environment of the Kamloops area is also acknowledged to be a great natural advantage for UCC. Another major strength is Geology's strong first year offering(s). Shortcomings include minimal resources/equipment and the practical limitations inherent in a "one-faculty geology department". It is recognised that a Geology program at UCC, and indeed the delivery of existing upper-level courses on a regular basis, can only be achieved with the addition of some new laboratory equipment and another full-time instructor.

Note: The Review Committee interviewed two of the part-time lab instructors. Both pointed out that Geology is a basic/fundamental science and that the Kamloops area is especially well suited to its study. They feel strongly that UCC should have a Geology program, and further stressed that field trips are an essential part of the Geology learning experience. It was also suggested that a co-op program might be possible, though without more faculty it will be very difficult to develop more links with industry. There also may be opportunities to deliver distance education in Geology (in collaboration with Open University), with UCC providing the on-site lab component at prescribed times. This might be developed as a regional service. Another possibility related to this is the offering of evening courses for local professionals. All these suggestions, however, necessarily hinge on the addition of at least a second full-time faculty member.

STRENGTHS OF THE PROGRAM

The Review Committee identified the following strengths in the Geology Program.

1. INSTRUCTION

Overall, students rated the quality of instruction consistently high. A number of students, whose interest was sparked in the introductory course, ultimately took every other available Geology offering, even though these courses do not lead to a Minor in Geology. Comments from students included:

"The major strength of the program is the faculty"

"Faculty is very good and knowledgeable"

"Excellent teachers, understandable lectures, clear, precise, to the point"

2. DEDICATION AND COMMITMENT

The one full-time instructor must be commended for his dedication and commitment in maintaining and enriching the program. Rock and mineral collections are strong, considering the budget and size of the program. There is a small but active Geology Club. Through fundraising, and with the support of faculty, the members have gone on two major field excursions, and have also organised local field trips and activities. The instructor's passion for his subject has transferred to many students. Despite the fact that there is no Geology Degree Program, two of the three second- and third-year courses offered this past year had enrolments of twenty-nine and thirty-four students.

3. LOCATION

Kamloops is recognised as having a unique geological location. There are excellent fossil deposits in the area, as well as sites representing various geological environments, all within an hour or two of campus. The favourable climate and the variety of accessible landforms, rock, mineral and fossil occurrences make UCC a logical location for the study of earth sciences.

4. EXTERNAL ENVIRONMENT

The program currently has ties to a number of external agencies. These include the Thompson-Nicola Palaeontology Society and the Kamloops Exploration Group (KEG). KEG annually awards a \$1,000 bursary to a UCC student enrolled in Geology courses. There is also a proposal to establish the Interior Institute of Natural and Cultural History, which would be primarily a research facility. The Geology discipline initiated and leads the continuing development of this proposal.

5. EMPLOYMENT

Employment opportunities in the mining sector currently are on the rise. Exploration expenditures in the province have risen from \$40 million last year to a projected \$100 million this year, and the number of companies within the mining sector has also increased. Given the projected expansion of mining activity and the location of KEG, which has more than four hundred members, many of them practising geoscientists, UCC students with a strong background in geology would be well placed to take advantage of emerging opportunities.

AREAS OF GEOLOGY WHICH CAN BE IMPROVED **(WITH RECOMMENDATIONS)**

The Geology Review Committee identified the following aspects as being in need of improvement.

1. FACULTY APPOINTMENTS

Since the early eighties the Geology curriculum at UCC has been the responsibility of one full-time faculty member. For UCC to deliver all courses currently advertised in the calendar on a regular basis, the institution must commit to the appointment of an additional full-time faculty member. An additional person will ensure the regular delivery of transfer courses and also allow for creation of a Minor in Geology. Students have indicated a willingness to take more courses in this subject, and many have identified that they would pursue a Minor or Major in Geology if it were offered. With the mining industry currently on an upswing, UCC would be better positioned to prepare students for further training and employment opportunities in this sector.

Recommendation 1 (a)

Create and fill a second full-time Geology faculty position by fall 2005.

ACTION: VP Academic

The current full-time faculty member has expertise and knowledge in palaeontology, sedimentology, geomorphology, and quaternary geology, disciplines commonly grouped within "soft rock" geology. In order to complement the existing faculty, UCC should recruit a "hard rock" geologist, with knowledge and expertise in the areas of mineralogy and igneous and metamorphic petrology. This would allow delivery of a balanced program, with laddering to other institutions and a strong Minor.

Recommendation 1 (b)

The second full-time faculty appointment must be someone with demonstrated background in "hard rock" geology, including strengths in mineralogy and igneous and metamorphic petrology.

ACTION: Dean of Science; Chair, Physical Sciences; Geology faculty

2. INTERDISCIPLINARY COURSE OFFERINGS

In order to increase course offerings within Geology, the Committee feels that the Geology Department should explore the possibility of offering more cross-listed courses, similar to Geology 319 (Geomorphology), which can count as credit for Geography 319. In the light of the recent appointment in Geography of a physical geographer, there could be additional opportunities to deliver cross-listed courses that would benefit both Geology and Geography students. This would also enhance the offerings for the Geology Minor.

Recommendation 2 (a)

Further consultation should occur between Geology and the disciplines of Geography and Natural Resource Science to explore opportunities for delivery of more cross-listed courses, which would count as credit for the Geology Minor.

ACTION: Chairs, Physical Sciences and G.S.A.; Geology, Geography, and NRS faculty

3. FIELD TRIPS

An integral aspect of the study of Geology is field trips. Through firsthand exposure to geological formations, students gain knowledge, understanding, and appreciation of the study of Geology. At present, UCC students are not being offered these opportunities. The Committee feels that the inclusion of field trips in the Geology curriculum is essential, and will keep UCC's course offerings in line with those of other institutions where field trips are part of the curriculum. Field trips should be designed to be relatively short and easily accessible. If possible, courses should be scheduled so that the lab and one lecture are back to back, thus providing more flexibility for the inclusion of field excursions.

Recommendation 3 (a)

Geology Faculty should schedule at least one short field excursion in each relevant course, especially in the first-year and second-year courses. The full-time faculty and the lab instructors need to work collaboratively to deliver these trips. If possible, one lecture and a lab should be scheduled back to back to accommodate a field trip, and to allow two faculty members to supervise it.

ACTION: Chair, Physical Sciences; Geology faculty

There is some hesitancy within the Geology faculty to run field trips, due to concerns about liability issues. Yet several UCC programs regularly include field excursions in their curriculum, most notably the Bachelor of Natural Resource Science. Due diligence must be taken when planning and carrying out the trips, but they can be implemented.

Recommendation 3 (b)

The Geology faculty should consult with Linda Walch, Executive Assistant, Administration and Finance, and John Karakatsoulis, Chair of the Bachelor of Natural Resource Science, regarding field trip liability issues.

ACTION: Geology faculty

The small budget for field trips was one of the reasons cited for why field trips are not a standard component of Geology courses at UCC. With institutional vehicles no longer available, the necessity of renting vehicles has substantially increased the transportation costs for field excursions. The current budget of \$500.00 is not adequate and does not take into account these increased costs.

Recommendation 3 (c)

Allocation and release of additional funds to reflect the cost of field trips needs to occur: the annual budget for Geology field excursions should be increased to at least \$1,500.

ACTION: Dean of Sciences

4. EQUIPMENT

Enrolments in lower-level Geology courses are substantial. Geology 111 has been offered year round, including summer session, since 1998, and has averaged 140 students per year. To date, lab space has been adequate, and the rock and mineral samples are generally good. The number of microscopes is not adequate for the size of the labs, and often four students are sharing a microscope. Additional microscopes are required to remedy this situation. In order to offer mineralogy and petrology, two courses that are required by APEGBC, the licensing body for Professional Geologists and Geoscientists, petrographic microscopes are required.

Recommendation 4 (a)

Purchase a minimum of six new petrographic microscopes for use in the Geology lab.

ACTION: Dean of Sciences

The video-flex camera is a teaching tool that allows the instructor to project images from the microscope onto a TV or computer screen, so that they are visible to the entire class. Science faculty outside UCC that use the video-flex describe it as an indispensable tool in their teaching.

Recommendation 4 (b)

UCC purchase one video-flex camera for use in Geology lectures and labs.

ACTION: Dean of Sciences

5. DEPARTMENTAL COMMUNICATIONS

The Committee identified that communications between members of the Geology discipline are fragmented. While the Committee recognises the difficulties of liaison in a discipline that has one full-time member and several part-time faculty, it is still important that communication among all faculty members occur on a regular basis. Communication will be especially important when planning and implementing field trips.

Recommendation 5 (a)

Regular meetings of the Geology faculty occur to discuss program concerns, issues, course updates, upcoming events, equipment and lab requests and other related topics. At least two meetings per term are recommended. E-mail can be used as a communication tool in the interim. Urgent concerns or requests should be brought to the attention of the Chair of the Department.

ACTION: Chair, Physical Sciences; Geology faculty

6. STUDENT EVALUATIONS

Some respondents to the student questionnaire felt they did not have regular opportunities to evaluate their Geology courses. Opportunities to provide feedback give students a sense of more "ownership" of the course, and instructors may benefit from student input with regard to course design and delivery. In contrast to data from the summative evaluation process, information from regular course evaluations in Geology would be used only by the instructor(s).

Recommendation 6 (a)

Geology faculty administer the UCC standard evaluation form during the second half of all Geology labs and lectures.

ACTION: Geology faculty

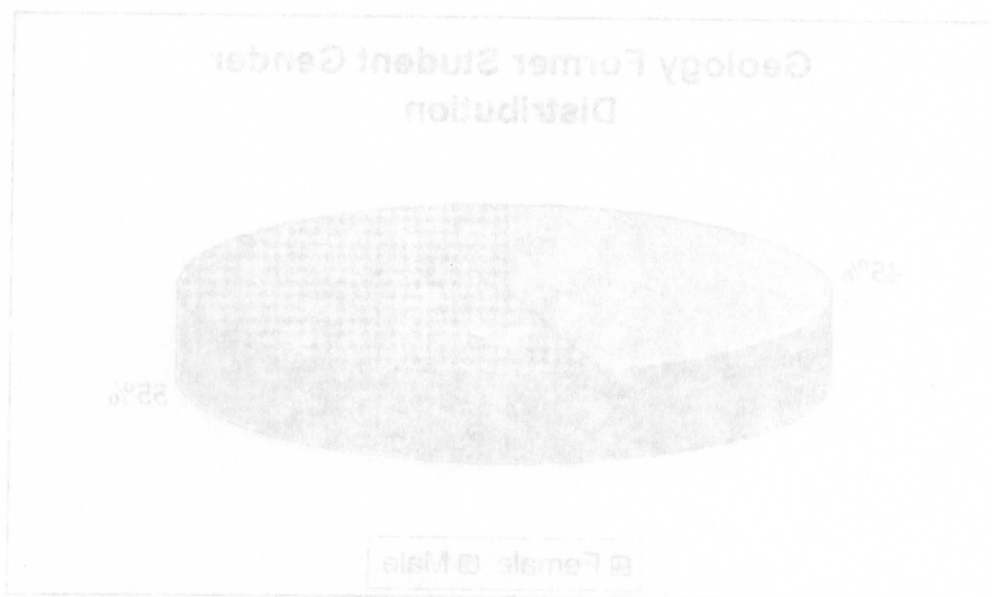
7. GEOLOGY WEB SITE

The current web site for Geology at UCC is outdated. It should be updated to include an accurate timetable indicating which courses are being offered and when, the transferability of each course (including the receiving institution and the credit granted), and the current faculty (both full-time and part-time). Eliminate the historical background of the program; this paints a picture of a program in peril and generally is not of interest to prospective students. A link to the Kamloops Exploration Group (KEG) should be included in the related links. A link to the proposed Interior Institute of Natural and Cultural History would also be valuable. The Projects and Collections section needs to be completed, and should include a section on donations-in-kind for potential donors.

Recommendation 7 (a)

Revision of the Geology web site to include (1) descriptions of courses and their availability, (2) a table or diagram outlining transferable courses, with links to the receiving institutions and the BC Council of Admissions and Transfer (BCCAT), (3) a list of the current faculty. The section on historical background should be replaced with one on possible careers in geology or geoscience. The Projects and Collections section needs to be completed with information on donations-in-kind.

ACTION: Geology faculty

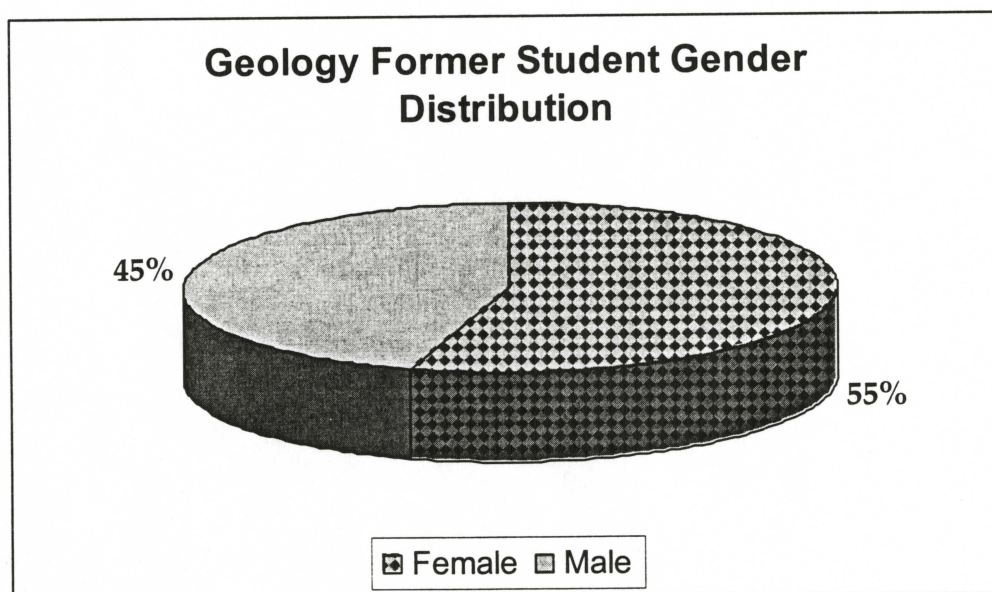


APPENDIX A **METHODOLOGY**

The data were collected in the following ways:

- 1) Survey instruments were designed and developed by Geology faculty and the Department of Institutional Research and Planning, and administered to former students (2000-03), current students (2004) and faculty. All data were processed using SPSS to achieve frequency rates and mean responses. Subjective comments for each group were recorded separately and anonymously.
- 2) The Geology faculty supplied a SWOT analysis; a historical program background and each Geology faculty member supplied his/her course outlines and a copy of his/her resumé.
- 3) Data on seat utilization, , gender and grade distributions, etc, were provided by the Office of Institutional Research and Planning.
- 4) The following people associated with the program participated in the review process or were interviewed:
 - Ken Klein, Geology, faculty
 - John Karakatsoulis, Chairperson, Natural Resource Sciences
 - Kathryn Dunne, Geology, Part-time faculty
 - Ed Frey, Geology, Part-time faculty
 - Doug Bickley, Chairperson, Physical Sciences
 - Larry Prins, Acting Dean of Sciences
 - Ron Wells, President, Kamloops Exploration Group
 - Five current Geology students

APPENDIX B **GENDER RATIO OF GEOLOGY FORMER STUDENTS**



APPENDIX C **GRADUATION RATES**

(Source: Colleague)

The following table reflect numbers of graduating minor students by discipline since 2000:

Discipline	2000	2001	2002	2003	TOTAL
Geology	-	-	-	-	0
Chemistry	2	2	1		5
Physics		1		1	2
TOTAL	2	3	1	1	7

APPENDIX D **COURSE PASS RATES**

(Source: Colleague)

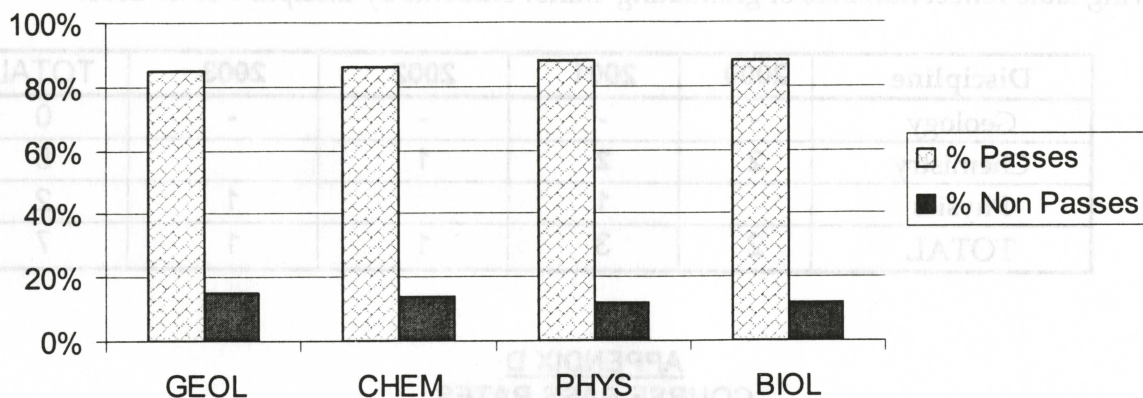
Pass rates may be determined by subtracting "fail" (F), "did not complete" (DNC), "withdrew" (W), and "audit" (AUD) from enrolment numbers. Hence, over the period of Fall 1999, Winter 2000, Fall 2000, Winter 2001, Fall 2001, Winter 2002, Fall 2002, Winter 2003 and Fall 2003, the following course pass rates are found:

	Total Registrants	Total Passes	Total Non Passes	% Passes	% Non Passes
1 ST year courses	686	575	111	84%	16%
2 nd year courses	177	158	19	89%	11%
3 rd /4 th year courses	74	67	7	91%	9%
Total	937	800	137	85%	15%

Comparison with other disciplines (academic programs only) for the same period.

Discipline	Total Registrants	Total Passes	Total Non Passes	% Passes	% Non Passes
GEOL	937	800	137	85%	15%
CHEM	4990	4288	702	86%	14%
PHYS	3095	2716	379	88%	12%
BIOL	9951	8787	1164	88%	12%

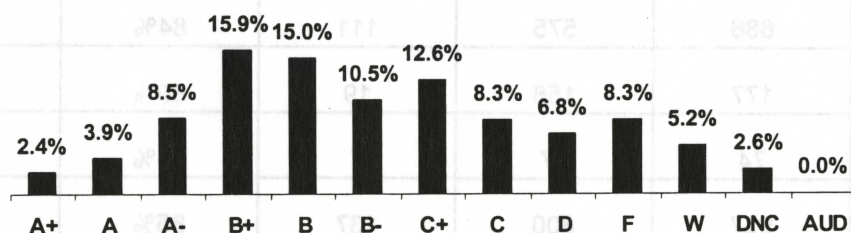
Course pass Rates (Fall 1999- Fall 2003 - Summer Session Excluded)



APPENDIX E LOWER LEVEL GRADE DISTRIBUTIONS: 99/FA -02/WI BY COURSE

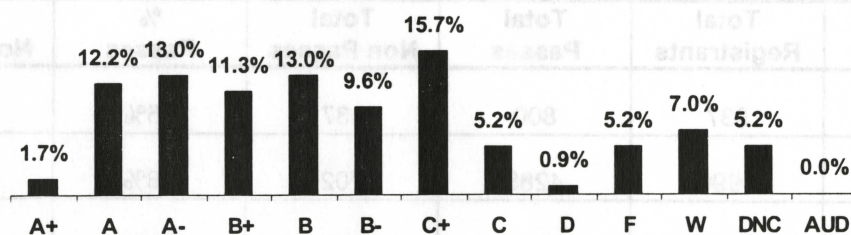
GEOL 111: INTRODUCTION TO PHYSICAL GEOLOGY

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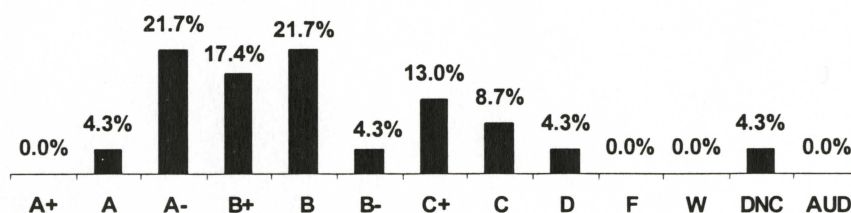
GEOL 205: GEOLOGICAL TIME

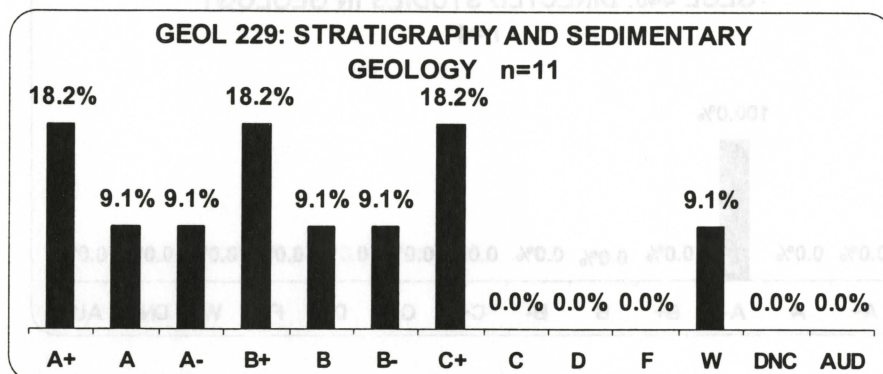
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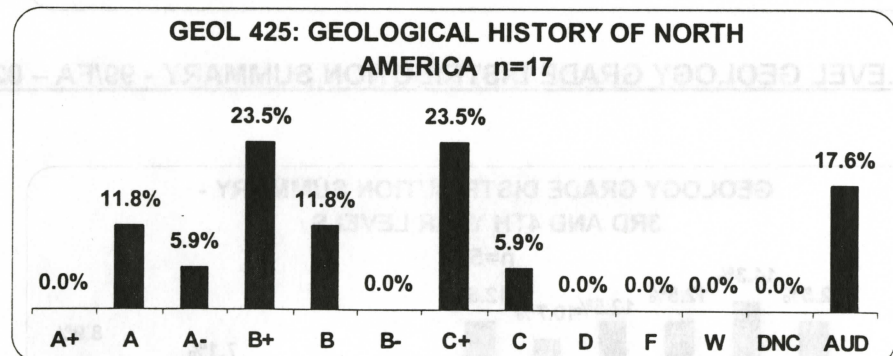
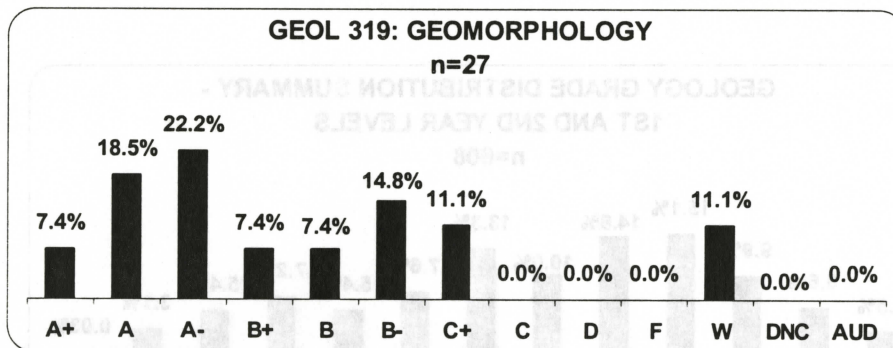
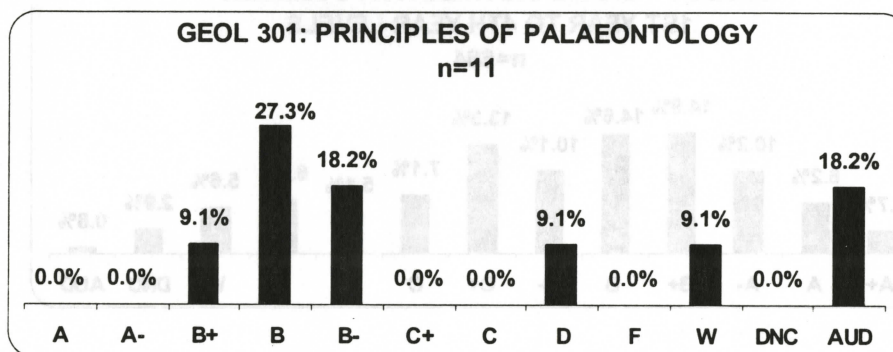
GEOL 210: MINERALOGY

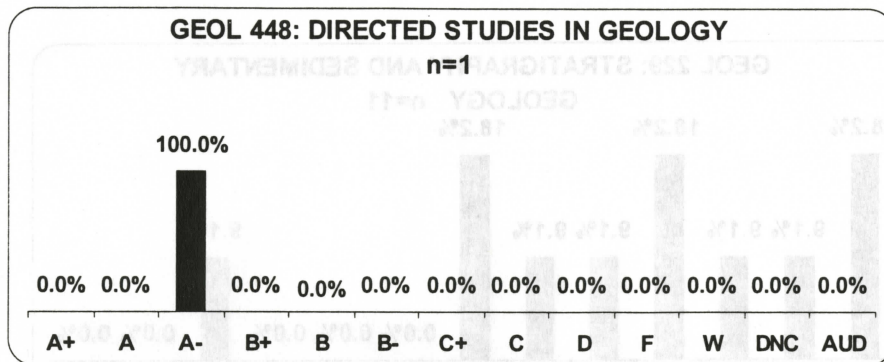
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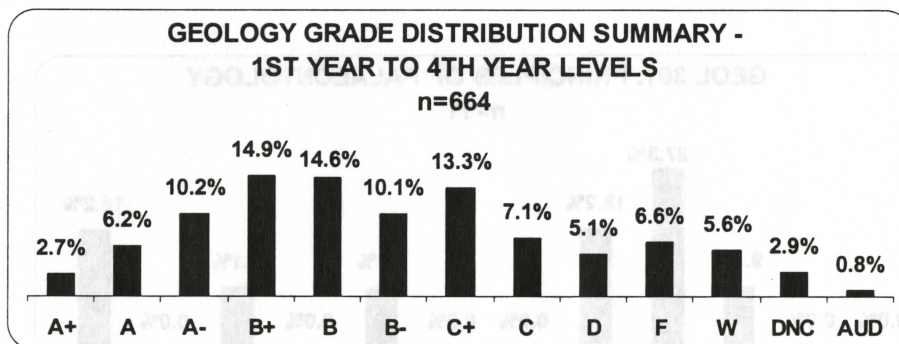


UPPER LEVEL GRADE DISTRIBUTIONS: 99/FA -02/WI BY COURSE

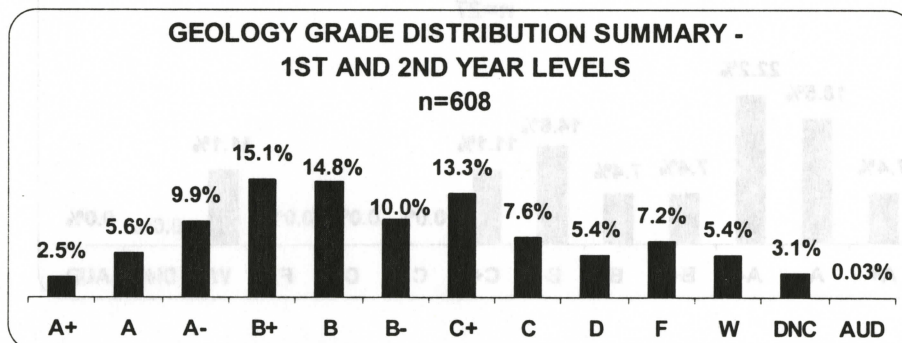




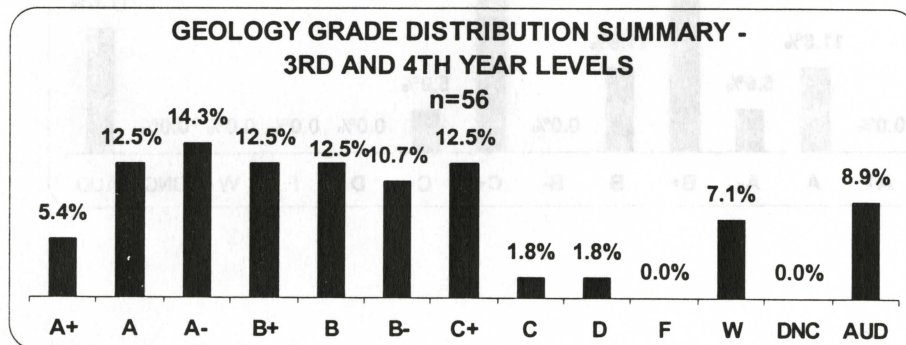
TOTAL GEOLOGY GRADE DISTRIBUTION SUMMARY - 99/FA – 02/WI



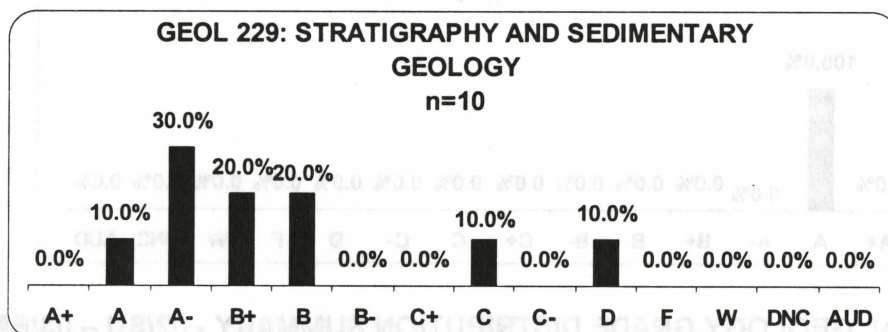
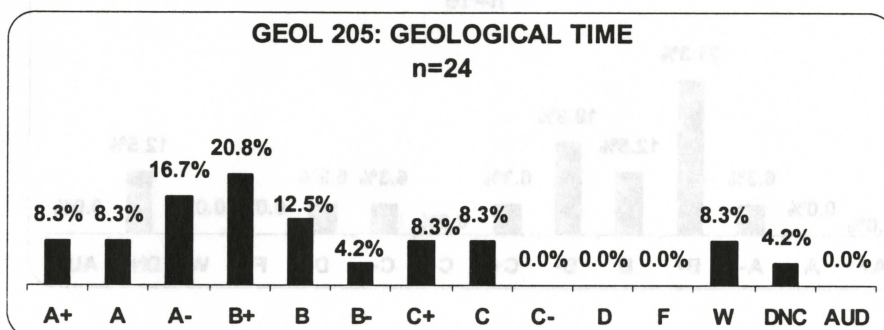
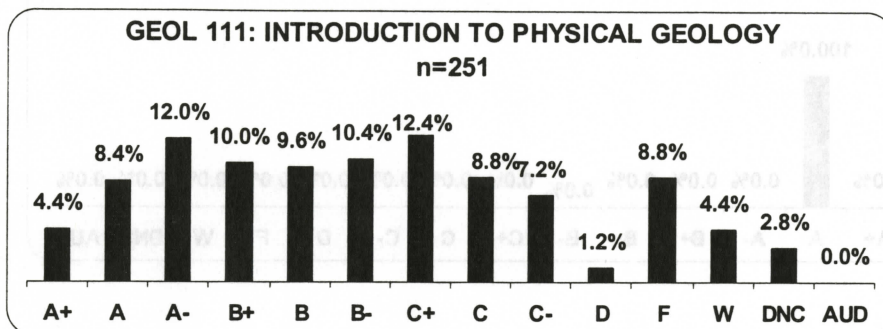
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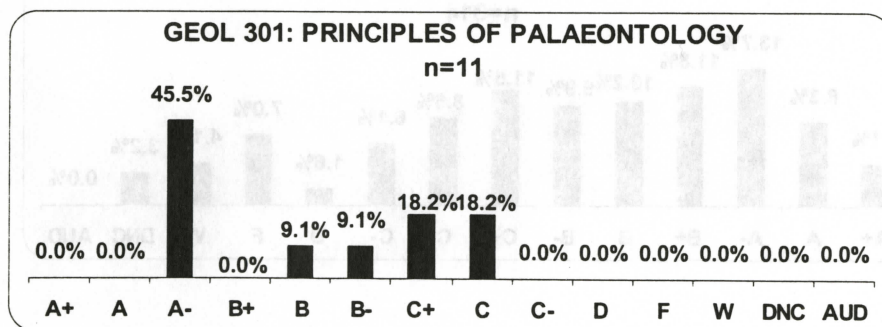
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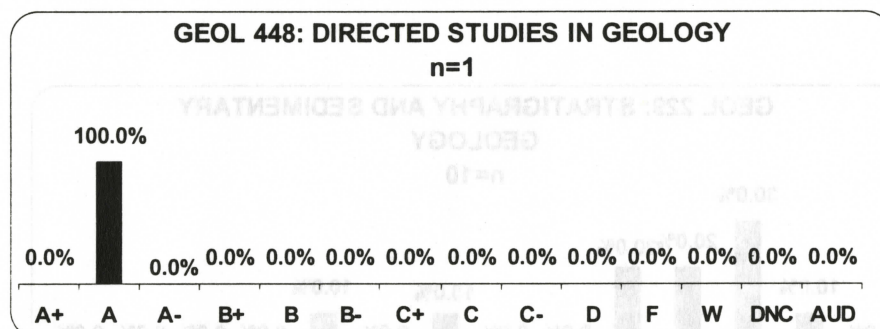
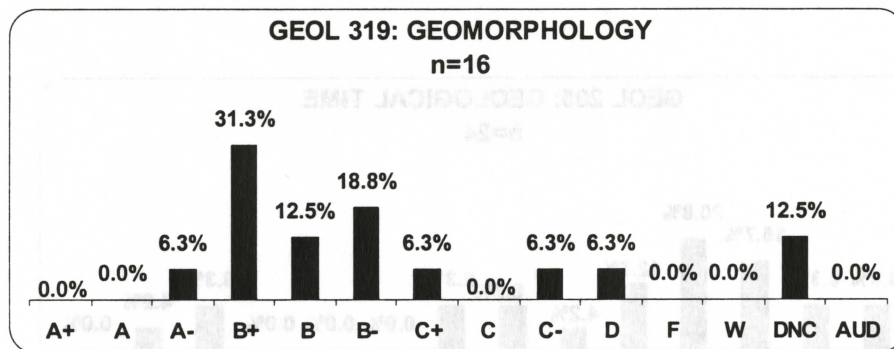
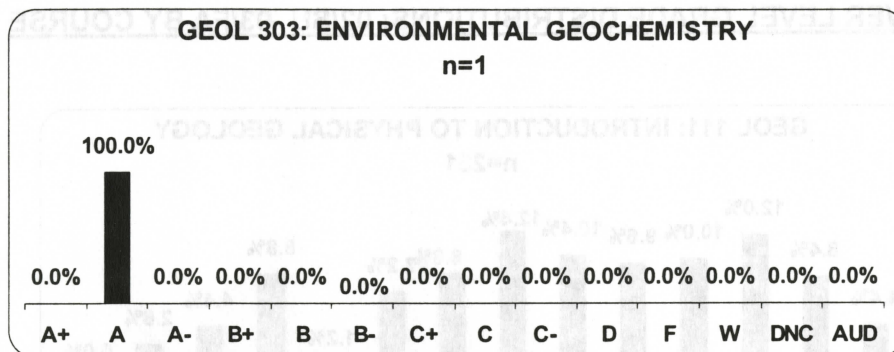


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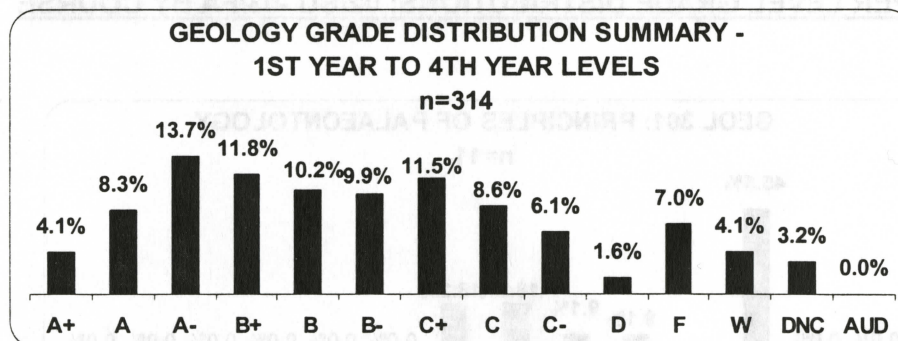


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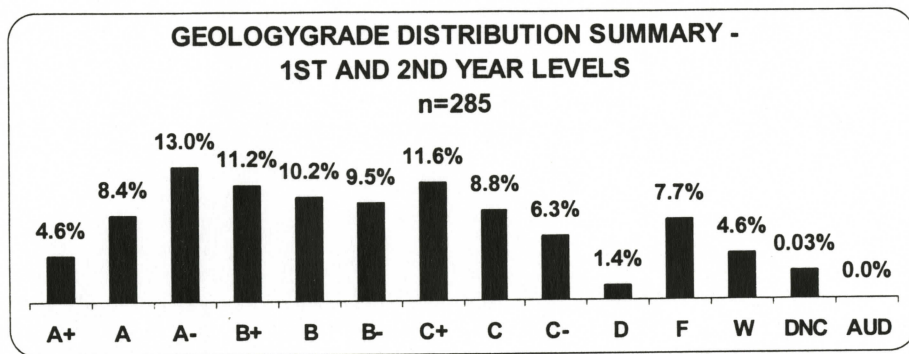




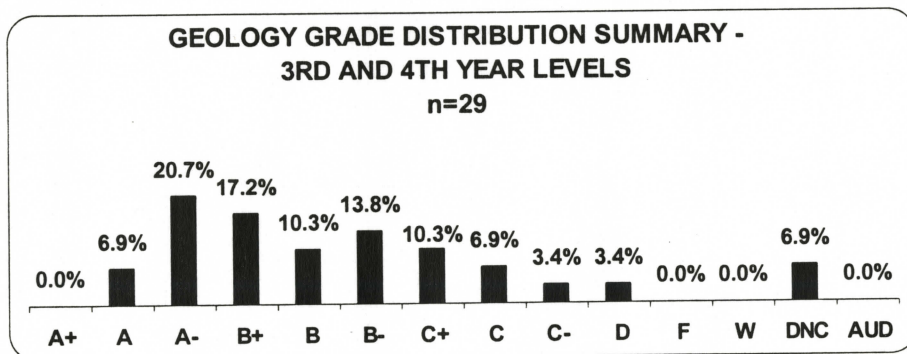
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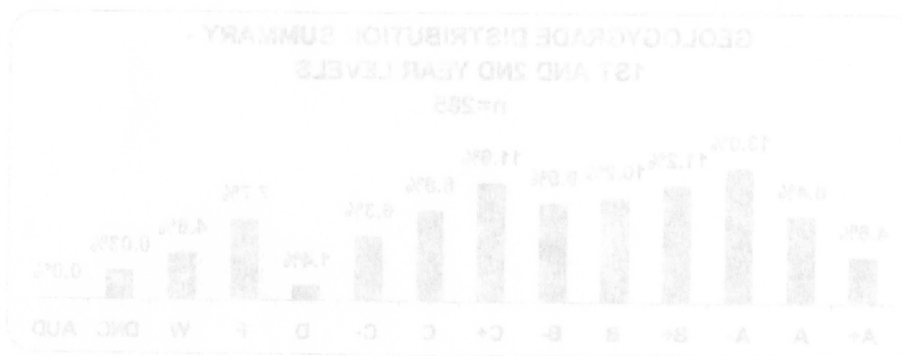
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UPPER LEVEL GEOLOGY GRADE DISTRIBUTION SUMMARY - 02/SU – 03/FA



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