Service course curriculum in Earth & Ocean Sciences

eosc…
110, 111, 112, 114, 116
310, 311, 312, 314, 315, 326

Mandate: Determine core learning outcomes for students in EOS service courses.
Def'n of EOS service courses: open to ALL; likely the only E/O/A course taken at UBC.

Start:

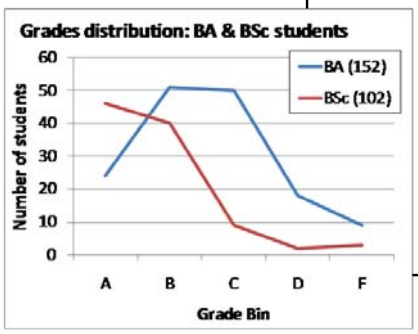
Eos-sei mandate → Current course goals → **Background (STLF):**
- Demographics
- Grades patterns
- Arts req'nts in Sci.
- Min. high school req'nts
- Instructor interviews
- Student interviews
- Attitudes

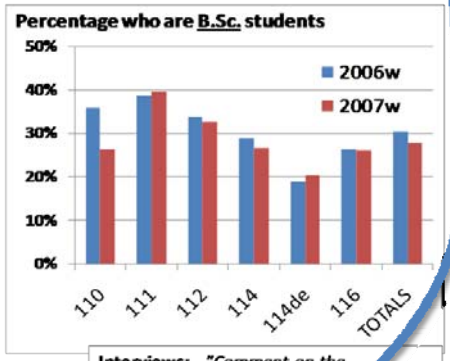
→ **Precedent (STLF):** LOTS of literature & meetings re. geoscience curricula

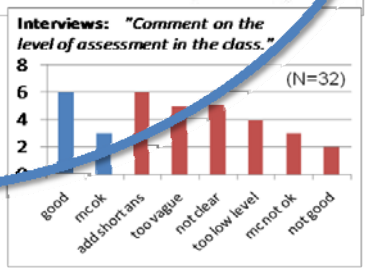
Examples of data

EOSC: 110	111	112	114	116	310	311	312	314	315	EOSC
	86	40	87	14	0	2	4	4	0	110
		40	127	21	0	1	0	0	1	111
			121	11	7	2	0	4	0	112
				115	38	18	2	20	11	114
					2	3	1	1	2	116
						44	3	40	14	310
							17	22	9	311
								5	2	312
									51	314
										315

No. students who took BOTH courses







Next:

3-person committee met weekly → Draft goals for all service courses. **"Many" iterations ☺**

Service course instructor feedback

All EOS faculty feedback

Table 1: Collected results from all faculty.

	CONCEPTS							SKILLS					HABITS AND ATTITUDES (learning and science)							
Item #	1a	1b	1c	1d	1e	1f	1g	2a	2b	2c	2d	2e	3ai	3aii	3aiii	3aiv	3b	3ci	3cii	3d
critical	18	13	7	16	15	6	14	13	9	14	15	13	14	2	11	8	18	12	9	16
important	5	7	8	6	6	8	5	8	7	6	6	8	7	14	11	12	1	10	9	5
touched on	0	3	8	1	1	9	4	1	5	3	2	2	2	6	0	3	1	1	5	1
not relevant	0	0	0	0	1	0	0	1	2	0	0	0	0	1	0	0	0	0	0	0

NOTE: Top row values are the number of faculty indicating the corresponding concept, skill or attitude as "critical" for all students to develop. Bottom row values indicate number of respondents the goal "not relevant".

Table 2: Collected results from service course instructors.

	CONCEPTS							SKILLS					HABITS AND ATTITUDES (learning and science)							
Item #	1a	1b	1c	1d	1e	1f	1g	2a	2b	2c	2d	2e	3ai	3aii	3aiii	3aiv	3b	3ci	3cii	3d
critical	17	15	12	19	13	6	6	12	8	7	4	3	18	5	5	2	16	20	2	7
important	9	9	6	8	11	8	11	9	3	3	10	12	6	5	5	12	9	6	7	14
touched on	3	4	10	2	3	15	12	8	13	15	14	13	3	5	12	11	2	3	10	6
not relevant	0	1	1	0	2	0	0	0	5	4	1	1	2	14	7	3	0	0	10	2

Key differences, all fac. vs service crs instructors.

Finally:

Modified aims for all EOS service courses.

Recommendations presented at Dep't retreat '09
- Goals matrix for each course.
- Make goals public (web).
- Use as start for degree program curricula reviews.
- Develop workshops: *"Teaching to meet Dep't aims"*.

List of aims is attached.

EOS-SEI
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Proposed Departmental Goals for Service Courses

1. **Knowledge and major concepts:** Students taking a service course in EOS will learn about …
   a. the spatial and temporal scales at which Earth's processes operate.
   b. how Earth changes through time.
   c. Earth's materials and their properties.
   d. Earth's systems and complex interactions.
   e. how Earth and humans are inextricably linked.
   f. the methods earth scientists use to collect and analyze evidence.
   g. how to use evidence to evaluate earth science concepts and draw conclusions.

2. **Skills:** Students taking a service course in EOS will develop their abilities to …
   a. read, visualize and interpret spatial representations of Earth science data.
   b. apply high school level math and science skills to real world settings.
   c. distinguish among evidence (data), models, assumptions, hypotheses, theories, interpretations, & predictions / recommendations in non-specialist readings or other media.
   d. reason with incomplete information.
   e. reason with and/or evaluate multiple working hypotheses.

3. **Habits and attitudes:**
   a. Service courses in EOS should actively help students to employ appropriate learning skills for the Earth, ocean or atmospheric sciences, including:
      i. identifying and using learning goals for the course, module or lesson;
      ii. consciously assessing progress and modifying study actions;
      iii. using feedback from instructors, peers, and/or self-reflection.
   b. Service courses in EOS should actively help students to consider science as an ongoing endeavor that embraces curiosity, creativity and societal needs, and is not just a set of facts.
   c. Service courses in EOS should actively help students recognize and experience two approaches used in the Earth system sciences, including:
      i. historical, descriptive, systems-oriented approaches;
      ii. experimental approaches.
   d. Service courses in EOS should actively help students to ask "How do we know?", "Why do we accept it?", and "What is the evidence for …?".