

# Five years of SEI in Earth and Ocean Sciences.

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Since 2007, Science Education Initiatives (SEI) in Earth and Ocean Sciences have focused primarily (although not exclusively) on specific courses and their principle instructors.

Currently, "course transformations" are winding down, so this poster graphically summarizes changes to our courses, and outline initiatives that use a more ad-hoc "consulting" model.

The EOS-SEI Long-Term Plan identified courses and instructors to receive focused support from four STLFs.

Exactly what happened during each "course transformation" depended upon instructor and student needs that were usually pinned down after a term of observing classes, labs, student work, and student thinking. Each project was tailored to suit the unique priorities and comfort levels of corresponding instructors and students.

	lable of course characteristics and impacts from EOS-SEI support.															instructors	and st	ud	ents.																							
								means the feature was introduced or enhanced as part of CWSEI transformation																																		
							class					content						home				other			Reports online (Internal EOS only)							EOS-SEI Long Term Plan, concieved in 2007, adjusted as time progress.										
cour	No.	term	short name	designed for N: # scns	Core (14) Service(4)	Both(5) No. TDOP	lecture	tested pre- readings	JITT prepost	clickers	inclass	grp work	Learn Goals	text book	Labs	writing	Math prgrmg / matlab	pre-class	assigs (not	labs') presen's or	other	Field	Other	archived	planning	teaching 1	teaching 2	Some Highlights		No	crs	Fall 2007 Spr 2008	Sum 2008	Fall 2008	Spr 2009	Sum 2009	Fall 2009	Spr 2010	5um 2010 Fall 2010	Spr 2011	Sum 2011	Fall 2011 Spr 2012
EOSC1	4 6	1,2,3	Natural Disasters	1200: 4	S	1	х			х			×	х	Х	(							X	<u>Y</u>	na	na	Sep-09	multi-instructors, clickers, v.lar	ge classes	1	EOSC114	2&T1 P3&	T2 P3	T3	T4							
EOSC1	1 1	1,2	Introduction to Earth Science P	200: 10	C,S			x			x	х	×		x		х	Х				П	x	P	na	na	Sep-09	1-credit lab course (no lecture)		2	EOSC111	2&T1 P3&	T2 P3	T3	T4							
EOSC2	21 3	2	Introductory Petrology	80	С	1	х		×		x	х	×	х	x x	(				х				Y	na	na	Fall 2009			3	EOSC221	P1 T1	P2	P2	T2	P3 P	P3 1	T3				
EOSC1	2 2	1,2	The Fluid Earth - Atmosphere a	330: 2	C,S	1	х	x	×	x			×		х	t		×							na	Jan-10	Aug-10	clickers & testing of pre-reading	gs	4	EOSC112	P1	P1	P2&T1	P3&T2	P3 T	T3 1	T4				
EOSC2	20 2	1	Introductory Mineralogy	80	С		х				х		×	х	x x	t				X	х			P	na	na	AWOL			5	EOSC220	P1	P1	T1	P2	P2 T	/2 F	P3 P:	3 T3			
EOSC2	1 1	1	Topics in Earth & Planetary Scientific Control of the Control of t	€ 30	С	1	х	×	×		x	х	×			×		x		×			x	Y	na	Aug-09	Aug-10	Other=pre-post on MBR. Scient	e thinking	6	EOSC212	P1	P1	T1	P2	P2 T	/2 F	P3 P:	3 T3			
EOSC2	0 2	1	Earth Science for Engineers	220	С		х			x	x	х	×	х	x x	t	х							Y	na	na	Sep-09			7	EOSC210	P1	P1	T1	P2	P2 T	T2 F	P3 P:	3 T3			
EOSC3		2	Tectonic Evolution of North An	r 50	С	1	х	х	x x		x	Х	×		х	x x		X			X			P	na			"pseudo" Just in Time Teaching		8	EOSC332			P1	T1	P2 P	P2 1	T2 P:		T3		
EOSC3	22 1	2	Metamorphic Petrology	50	С	1			х				×				х	×						P	na	Jul-09	Aug-10			9	EOSC322			P1	T1	P2 P	P2 1	T2 P:	3 T3			
EOSC3	5 1	1 (2)	The Planets	80	S		х	х		х	x	х	×		×	t		x	х	×				P	na	Aug-09	Dec-11	class teams, worksheets, clicke	rs, project	10	EOSC355			P1	T1	P2 P	P2 1	T2 P:	3 T3			
EOSC2	1 2	1	Computer Methods in Earth, O	60	С		х			x	x	х	×		x x	t	x x		x						Jul-09	9 Aug-10	AWOL	worksheets, pair-programming	, clickers	11	EOSC211				P1	P1 T	/1 /	P2 P3	2 T2	P3	P3	T3
EOSC3	72 3	1	Introductory Oceanography: Ci	i 250	C,S		х	x		х			×					×	X					P	Fall 09	9 Aug-10	Dec-11	daily online hmwrk checks on r	dgs	12	EOSC372				P1	P1 T	1 /	P2 P	2 T2	P3	P3	T3
EOSC3	<b>73</b> 3	2	Introductory Oceanography: Cl	150	C,S	1		x		x			×					×	x					P	na	Aug-10	AWOL			13	EOSC373					P	1	T1 P:	2 P2	T2	P3	P3
EOSC2	2 1	-	Geophysical properties of mat	20	С		х				х		×		x x	t	x		х					<u>Y</u>	na	Dec-11	na*	no longer taught		14	EOSC252				ىلىك	P	1	T1 P	2			
EOSC4	1 2	2	Introduction to Marine Chemis	s 30	С		х			х	х	Х	X		х	ť	х		х						na	AWOL	Pending			15	EOSC472					P	1 7	T1 P	2 P2	T2	P3	P3
EOSC3	21 1	1	Igneous Petrology	50	С		х		х		х	Х	×	х	х	x x			х	х			х		Aug-1	.0 Dec-11	Pending	Poster/present'n is a choice		16	EOSC321	P = p	olanning to	arm				P1 P	1 T1	P2	P2	T2
EOSC3	31 2	1	Intro. Mineral Deposits and Ex	p 50	С		х				х	х	×		x x	r e				×					AWOL	L AWOL	Pending	(		17	EOSC331	T = t	eaching te	erm	ىلىك			P1 P	1 T1	P2	P2	T2
EOSC3	26 1	1	Earth and Life Through Time	150	S	4	х	x		x	×	х	×	х	x x	t		×							Aug-1	.0 Dec-11	Pending	'Labs' for >150; 50min class acti	vities	18	EOSC326							P1 P	1 T1	P2	P2	T2
EOSC3	29 1	1	Groundwater Hydrology	150	C,S	3	х			х	x	х	X		x x	x x	х					>	(		Aug-1	0 AWOL	Pending	Socratic lect, clickers (eg deriva	itions), soi	19	EOSC329							P1 P	1 T1	P2	P2	T2
EOSC2	2 1	2	Geological Time	60	С	12	х	x		х	х	х	х	х	х	t		×							na	Dec-11	Pending	Inclass activities		20	EOSC222							P	1 P1	T1	P2	P2 T2
EOSC3	0 1	1	Intro applied geophysics for ge	e 50	С		х	х			х	х			x x	t	х	x							na	na	na	aspects of team based learning			EOSC350	ransformed to i	ncorporate tea	m based lea	aming by F. J	anes, then pe	dago gy tra	ansferred to	a Post Doc	n 2007 and Pro	ofessor D. Ok	lenburg in 2008.
EOSC3	10 2	1, 2	Global Climate Change	300: 2	S	1	х	х	X	х	х		×	х	х	t		х	х						na	na	na	interactive lecture, scalable to	>250		EOSC340	esigned to inco	rporate best pr	actices by 8	Jara Harris in	2010.						
EOSC3	3 1	2	Elem&iso geochem	50	С	1	х				x	х	×	х	хх	x x					x				na	na	na				EOSC333	DSC333 Undergoing accelerated transformation with Prof. Dominique Weis with STLF Brett Gilley's assistance.										

#### Other classes modified with SEI help (i.e. some consulting): Obs Highights Meteorlgy storms 120 C 1 Just in Time teaching ENVR200 2 C 1 highly engaged; no lecture Intr envrmnt sci 100: 2 C 1 highly engaged; no lecture Int res ENVRsci ENVR400 1 Rsrc pri env sci 50 C highly engaged: no lecture The solid earth EOSC110 2 400:2 C,S 1 capstone course EOSC116 Mesozoic earti 250 1 clickers 80 C,S 1 clickers EOSC270 Marine ecosysten Field geology the senior field mapping course 40 jigsaw projects Potential fields geophys refined use of projects

#### Faculty incentives:

→ 22 additional TAs (mostly 6hrs/wk for 1 term) → 28 Teaching assignment reductions (mostly 0.5 course load)

## **EOS-SEI:** Other aspects

### **Teaching assistants**

- EOSC516 is run largely by students who have taken the course
- Contributions to lab exercise development by TAs have been keys to success in several courses.
- Several TAs have gone on to teach courses as sessional instructors.

#### Curriculum

- Investigated precedent for curriculum review strategies.
- Learning goals for "service" courses (below) developed and approved by all faculty.
- Hiring practices of industry investigated and reported on.
- Matrix aligning program level goals with course practices for the re-instated B.Sc. Geology.
- First year needs for B.Sc. Geol.

#### Resources, etc.

- Website and Monthly "Times"
- Guidelines & documentation (see matrix above).
- Over 56 publications, posters, presentations and workshops.
- Four concept inventories
- Three undergrad honors geology theses in geoscience education.
- Classroom Practices Observations

Some examples below

#### EOS-SEI: Life after "transformation projects" ... consulting The consulting model: 78 consultations in 9 mths involved ... · E-mails to all EOS faculty from SEI Director announced EOS 1xx courses availability. EOS 2xx courses EOS 3xx courses · Faculty with no prior SEI experience specifically targeted. EOS 4xx courses EOS graduate courses • STLFs budgeted 4-8 hrs/week for consulting. EOS curriculum related issues · Consulting time has evolved towards 8-16 hrs/wk. museum, copyright, autograding, etc. • STLFs dropped in to "chat" with faculty. Help offered if helping UBC colleagues helping non-UBC colleagues appropriate. 10 15 · STLFs offered analysis of current, or new data sets. Consultations were about ... exercise or activity advice oedagogy and instruction advice · "Impact assessment" is harder to document clearly. assessment advice data creation or analysis • Judgments about project scale - "big" projects do need curriculum or institution issue advice discussion. workshop development or delivery · Even handed distribution of services. research oriented 5 10 15 20 25 44 instructors, sessionals or colleagues: 24 got 1 consult Consultations were started by ... got 2 consults Instructor (EOS) dropping in asking for specific aid. got 3 consults Instructor (not EOS) requesting advice or input got 4 consults STLF - cold call - ask if we can help got 5 consults Instructor (FOS) - respond to generic offer STLF - planned regular meetings. got 6 consults STLF self generated task got 7 consults STLF - knock on door to check on prior consult got 9 consults STLF - about prior service or data 22 of 44 had NOT received SEI support before. 0 5 10 15 20 25 30

Service course goals; Times editions; some guidelines; communications list ...