Course Approval Form

For instructions see:
http://registrar.gmu.edu/facultystaff/catalog-revisions/course/

Action Requested:

- [X] Create new course
- [ ] Inactivate existing course
- [ ] Reinstate inactive course
- [ ] Modify existing course (check all that apply)
  - [ ] Title
  - [ ] Prereq/coreq
  - [ ] Other:
  - [ ] Credits
  - [ ] Schedule Type
  - [ ] Repeat Status
  - [ ] Restrictions
  - [ ] Grade Type

Course Level:

- [ ] Undergraduate
- [X] Graduate

College/School: College of Science
Department: AOES
Submitted by: Dr. Rick Diecchio
Ext: 3-1208
Email: rmcbride@gmu.edu

Subject Code: GEOL
Number: 565
(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Effective Term:

- [ ] Fall
- [ ] Spring
- [X] Summer

Year 2015

Title:
Current:
Banner (30 characters max w/ spaces):
New: Paleoceanography

Fulfills Mason Core Req? (undergrad only)

- [ ] Currently fulfills requirement
- [ ] Submission in progress

Credits: (check one)

- [3] Fixed
- [ ] Variable

or
to

Repeat Status: (check one)

- [X] Not Repeatable (NR)
- [ ] Repeatable within degree (RD)
- [ ] Repeatable within term (RT)

Maximum credits allowed:

Grade Mode: (check one)

- [X] Regular (A, B, C, etc.)
- [ ] Satisfactory/No Credit
- [ ] Special (A, B C, etc. +IP)

Schedule Type: (check one)
LEC can include LAB or RCT

- [X] Lecture (LEC)
- [ ] Lab (LAB)
- [ ] Recitation (RCT)
- [ ] Internship (INT)
- [ ] Independent Study (IND)
- [ ] Seminar (SEM)
- [ ] Studio (STU)

Prerequisite(s):
Previous course in oceanography or marine science and 16 credits of geology or earth science courses, or permission of instructor.

Corequisite(s):

Instructional Mode:

- [X] 100% face-to-face
- [ ] Hybrid: ≤ 50% electronically delivered
- [ ] 100% electronically delivered

Restrictions Enforced by System: Major, College, Degree, Program, etc. Include Code.

Are there equivalent course(s)?

- [ ] Yes
- [X] No

If yes, please list

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	**Notes** (List additional information for the course)
Investigates ocean evolution through geologic time. Earth's ocean sediment archive provides proxy data on paleo-ocean chemistry, biology, geology and physical properties. Class examines proxy reconstructions of oceanic conditions such as circulation, salinity, stratification, anoxia, and biogeochemistry. Discusses the history of ocean basins, with case studies from Precambrian to Holocene.	

Indicate number of contact hours: Hours of Lecture or Seminar per week: 3 Hours of Lab or Studio:

When Offered: (check all that apply)

- [ ] Fall
- [ ] Summer
- [X] Spring

Approval Signatures

Department Approval Date

College/School Approval Date

If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Courses Only

Graduate Council Member

Provost Office

Graduate Council Approval Date

For Registrar Office's Use Only: Banner_____Catalog_____

revised 10/16/14

Course Proposal Submitted to the Curriculum Committee of the College of Science

1. COURSE NUMBER AND TITLE: GEOL 565

Course Prerequisites: Previous course in oceanography or marine science and 16 credits of geology or earth science courses, or permission of instructor.

Catalog Description: Investigates ocean evolution through geologic time. Earth's ocean sediment archive provides proxy data on paleo-ocean chemistry, biology, geology and physical properties. Class examines proxy reconstructions of oceanic conditions such as circulation, salinity, stratification, anoxia, and biogeochemistry. Discusses the history of ocean basins, with case studies from Precambrian
to Holocene.

2. COURSE JUSTIFICATION:

Course Objectives: This course will provide one of the core courses (Hydrosphere) for the MS in ESS degree.

Course Necessity: AOES currently does not provide any Hydrosphere core courses for MS in ESS degree.

Course Relationship to Existing Programs: Course is designed to fulfill core Hydrosphere requirement in support of the Earth Systems Science MS.

Course Relationship to Existing Courses: Course content is not covered in other graduate courses so it does not conflict with existing courses.

3. APPROVAL HISTORY: Approved by AOES faculty on 21 Nov 2014.

4. SCHEDULING AND PROPOSED INSTRUCTORS:

Semester of Initial Offering: Spring '15

Proposed Instructors: Dr. Linda Hinnov

5. TENTATIVE SYLLABUS: See below.

PALEOCEANOGRAPHY

Dr. Linda Hinnov
Dept. of Atmospheric, Oceanic, & Earth Science
GEOL 565
3 credits

PALEOCEANOGRAPHY – Investigation of ocean evolution through geologic time. Earth's ocean sediment archive provides proxy data on paleo-ocean temperature, chemistry, biology and geology. Paleo-oceanic conditions reconstructed from proxy data are examined, e.g., circulation, salinity, stratification, anoxia, and biogeochemistry. The history of ocean basins, and case studies from Precambrian to Holocene are discussed. (3 credits; cross-listed: GEOL 565, CLIM 759)

Instructor: Linda Hinnov, Dept. AOES, email: lindahinnov@gmail.com
Meetings: Mondays, 16.30-19.15, Exploratory 1005, with 10 seats available.
Materials: Online resources, review and research articles. (No textbook.)
Requirements: 5 homework assignments (mainly student activity write-ups) (50%), 2 one-hour-long exams (50%).
Ethics: Consult http://oai.gmu.edu/the-mason-honor-code-2/ for course policy.
Grading: Homework and exams are individually scaled to 100 points. Grade scale is as follows:

SCORE	GRADE
99 – 100%	A+
92 – 98%	A
89 – 91%	A-
87 – 88%	B+
82 – 86%	B
79 – 81%	B-
77 – 78%	C+
72 – 76%	C
69 – 71%	C-
60 – 68%	D
Below 60%	F

Syllabus: half-time lecture; half-time student activity. (Topics subject to change.)

Jan 26-Week 1 – Ocean physico-chemistry: bathymetry, temperature, salinity, density, circulation, tides, couplings, oxygen, carbon, silica, iron, trace elements
Feb 2-Week 2 – Ocean biology: primary productivity, decomposition, Redfield ratios
Feb 9-Week 3 – Ocean sedimentology: coastal to deep-ocean; terrigenous and marine sediment (**HW1**)
Feb 16-Week 4 – Temperature proxies: oxygen, clumped isotopes, Mg/Ca, alkenones, faunal assemblages
Feb 23-Week 5 – Salinity proxies: oxygen isotopes, chlorinity, faunal assemblages (**HW2**)
Mar 2-Week 6 – Volume proxies: sea level, oxygen isotopes, Sr/Ca
Mar 16-Week 7 – Circulation proxies: carbon isotopes, Cd/Ca, radiogenic Nd, Pb, Sr, Hf, Os (**EXAM**)
Mar 23-Week 8 – Productivity proxies: carbonate, opal, carbon isotopes, barite (**HW3**)
Mar 30-Week 9 – Tidal proxies: bivalves, stromatolites, tidalites
Apr 6-Week 10 – Recent paleo-oceans and the Last Glacial Maximum
Apr 13-Week 11 – Cenozoic ocean evolution: gateways, global cooling and glaciation (**HW4**)
Apr 20-Week 12 – Greenhouse-icehouse oceans of the Phanerozoic Eon; Strangelove oceans
Apr 27-Week 13 – Archean-Proterozoic oceans, the Great Oxidation Event and Snowball Earths (**HW5**)
May 4-Week 14 – Earth's earliest oceans; Late Heavy Bombardment vaporization (**EXAM**)