



Course Approval Form

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

Action Requested:

Create new course Inactivate existing course Reinstate inactive course

Modify existing course (check all that apply)

Title Credits Repeat Status Grade Type

Prereq/coreq Schedule Type Restrictions

Other:

Course Level:

Undergraduate

Graduate

College/School: Department:

Submitted by: Ext: Email:

Subject Code: Number: Effective Term: Fall Spring Summer Year:

(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Title: Current Banner (30 characters max w/ spaces) Discipl Based Educ Research

New Fulfills Mason Core Req? (undergrad only)

Currently fulfills requirement

Submission in progress

Credits: Fixed or Variable

Repeat Status: Not Repeatable (NR) Repeatable within degree (RD) Repeatable within term (RT) Maximum credits allowed:

Grade Mode: Regular (A, B, C, etc.) Satisfactory/No Credit Special (A, B, C, etc. +IP)

Schedule Type: Lecture (LEC) Lab (LAB) Recitation (RCT) Internship (INT)

Independent Study (IND) Seminar (SEM) Studio (STU)

Prerequisite(s): Corequisite(s):

Instructional Mode: 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 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)
Students will conduct an original Discipline-Based Education Research (DBER) project with their faculty mentor and STEM Accelerator faculty mentor. Course is RS designated.	
Indicate number of contact hours: Hours of Lecture or Seminar per week: <input type="text" value="3"/> Hours of Lab or Studio: <input type="text"/>	
When Offered: (check all that apply) <input type="checkbox"/> Fall <input type="checkbox"/> Summer <input checked="" type="checkbox"/> 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 _____

Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC's reference. Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

FOR ALL COURSES (required)

Course Number and Title: STEM 401 RS: Discipline-Based Education Research

Date of Departmental Approval: September 10, 2014

FOR INACTIVATED/REINSTATED COURSES (required if inactivating/reinstating a course)

- Reason for Inactivating/Reinstating:

FOR MODIFIED COURSES (required if modifying a course)

- Summary of the Modification:
- Text before Modification (title, repeat status, catalog description, etc.):
- Text after Modification (title, repeat status, catalog description, etc.):
- Reason for the Modification:

FOR NEW COURSES (required if creating a new course)

- Reason for the New Course: Students will be a Learning Assistant (LA) as the first semester experience, which currently requires participation in a seminar that is not credit bearing. These LAs present a poster during the seminar, which may or may not qualify to be a research project. (Out of ~120 LAs who took the course in the last 18 months all but 1 presented a poster; many of these posters were completed collaboratively). Therefore, the big idea is to provide a venue for LAs to further their research project to carry over into STEM 401 RS.
- Relationship to Existing Programs: Would improve the quality of the Learning Assistant Program, which is a cornerstone of The Accelerator Program.
- Relationship to Existing Courses: None.
- Semester of Initial Offering: Spring 2015.
- Proposed Instructors: Reid Schwebach, Mary Nelson, Mary Ewell, Claudette Davis.
- Insert Tentative Syllabus Below

STEM 401 RS: Discipline-Based Education Research

Spring 2015 – CRN: NNNNN, Section 1

Six Thursday sessions, 6:00-9:00pm, Exploratory Hall 4208

Credits: 2-3



Instructor: Dr. Reid Schwebach
Office: Exploratory Hall 1401

E-Mail: jschweba@gmu.edu
Phone: 703.993.4232

Office hours: Tues. – Thurs., 3:30-4:15 PM or by appointment



Required Texts

Cresswell, J. W. (2013). *Research design: Quantitative, qualitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.
ISBN: 978-1452226101

We will also be using Blackboard in this class. Log in at <http://mymason.gmu.edu>.

Course Description

This class is designated as a *Students as Scholars* Research and Scholarship (RS) Intensive Course, which means that you are given the opportunity to actively participate in the process of scholarship and will make a significant contribution to the creation of a disciplinary-appropriate product. To learn more about *Students as Scholars*, visit oscar.gmu.edu. This undergraduate course is designed for returning Learning Assistants (LAs) in the STEM Accelerator program. Students will conduct an original Discipline-Based Education Research (DBER) project with their faculty mentor and STEM Accelerator faculty mentor. Throughout the course, students will learn about what DBER entails. The instruction will assist them in their work by providing valuable resources and information. Each student will create a scholarly paper that represents their work and will present their research at a poster session at the conclusion of the semester.

Student Outcomes

The student outcomes for this course are those of a research and scholarship (RS) intensive course as designated by Students as Scholars.

- Students will create an original scholarly or creative project,
- Students will communicate knowledge from an original scholarly or creative project.
- In the process of working on the project, students will do the following Scholarly Inquiry-level student learning outcomes. Four of these, in bold, are prioritized in the course:
 - Articulate and refine a scholarly question.
 - Follow ethical principles.
 - Choose an appropriate discovery process for scholarly inquiry.
 - Gather evidence appropriate to the question.
 - **Apply appropriate scholarly conventions during scholarly inquiry.**
 - **Apply appropriate scholarly conventions when reporting or performing.**
 - **Assess the validity of key assumptions and evidence.**
 - Situate the scholarly inquiry within a broader context.

Course Structure

Students will attend class 6 times throughout the semester, where they will learn about DBER and resources. Biweekly meetings with the faculty mentor and an Accelerator faculty member will be required, along with weekly communication. In addition, students will attend at least 3 of the COS DBER seminars, as well as frequently attending the weekly LA seminars, and attending the *Students as Scholars* poster workshop.

Attendance and Late Work Policy

Regular attendance and participation are expected. Attendance and grades are highly correlated in any class. Except in the very rare case of last minute emergencies (e.g.: you were hit by a car as you were walking to class and were taken to the emergency room), you should let me know about any excused absences and make arrangements for making up any missed work in advance. I do not consider work-related absences, work in other classes, oversleeping, or meetings with other professors a personal emergency.

Unless otherwise announced, all assignments are due at the beginning of class on the day that they are due. You should NOT expect to be allowed to turn in assignments later in the day for full credit. Late work will not be accepted except in the case of a documented personal emergency or excused absence. You will not be allowed to make up in-class assignments or exams unless you have a documented, excused absence. It is your responsibility to provide **written documentation** from a third party of your emergency or university-excused absence

Academic Integrity

The integrity of the University community is affected by the individual choices made by each of us. GMU has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using MLA or APA format. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me. For more information about the honor code, please see <http://oai.gmu.edu/>.

Disability Accommodations

If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the Office of Disability Services. If you qualify for accommodation, the ODS staff will give you a form detailing appropriate accommodations for your instructor. In addition to providing your professors with the appropriate form, please take the initiative to discuss accommodation with them at the beginning of the semester and as needed during the term. Because of the range of learning differences, faculty members need to learn from you the most effective ways to assist you. If you have contacted the Office of Disability Services and are waiting to hear from a counselor, please let your instructor know.

Diversity

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason's commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

Acknowledging that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.

Privacy

Student privacy is governed by the Family Educational Rights and Privacy Act (FERPA) and is an essential aspect of any course. Your instructor cannot discuss your educational record with your parents, your friends, or anyone except for you. Because your GMU email is the only one that we can explicitly identify as belonging to you, your instructor will only communicate with you via email using your GMU address, and your instructor will not discuss grades via email.

Students must use their MasonLive email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

Course Assignments and Grades

Citi IRB Training Certificate	25
IRB Proposal	25
Draft Mini-Paper	25
Final Mini-Paper	200
Poster Presentation	50
DBER responses	75
Class Participation	60
Faculty Mentor Evaluation	60
Total Points Possible	520

Grades will be distributed in the following manner:

A+	97-100	B	83-86	D	60-69
A	93-96	B-	80-82	F	59 or less
A-	90-92	C+	77-79		
B+	87-89	C	70-76		

Rubric For Evaluation of Student Work

To determine grades on assignments, the course assignments will be evaluated using the current students as scholars master rubric, see: <http://oscar.gmu.edu/upload/Students-as-Scholars-Master-Rubric-9-14.pdf> . Please also consult the attached course rubric, which explains the course expectations about student creation of scholarship and scholarly inquiry: knowing these course goals will help students and mentors manage expectations about grades and better understand the grading process.

Students taking the course for 2 rather than 3 credits will spend 1/3 less time out of class conducting the research but will still need to attend all course sessions and participate in the same extent as a student taking the course for 3 credits.

Tentative Schedule

Meeting	Date	Topic	Assignment Due
1	1/23	Introduction to DBER and project expectations	<ul style="list-style-type: none"> 5 DBER articles on Blackboard, look over NRC DBER report (http://sites.nationalacademies.org/DBASSE/BOSE/DBASSE_072106). Be prepared to discuss these five specific articles: <p>Adesoji, F. A., & Raimi, S. M. (2004). Effects of Enhanced Laboratory Instructional Technique on Senior Secondary Student's Attitude toward Chemistry in Oyo Township, Oyo State, Nigeria. <i>Journal of Science Education and Technology</i>, 13(3), 377–385.</p> <p>Clary, R. M., & Wandersee, J. H. (2007). A mixed methods analysis of the effects of an integrative geobiological study of petrified wood in introductory college geology classrooms. <i>Journal of Research in Science Teaching</i>, 44(8), 1011–1035. doi:10.1002/tea.20178</p> <p>Englebrecht, A. C., Mintzes, J. J., Brown, L. M., & Kelso, P. R. (2005). Probing Understanding in Physical Geology Using Concept Maps and Clinical Interviews. <i>Journal of Geoscience Education</i>, 53(3), 263–270.</p> <p>Gray, K. E., Adams, W. K., Wieman, C. E., & Perkins, K. K. (2008). Students know what physicists believe, but they don't agree: A study using the CLASS survey. <i>Physical Review Special Topics - Physics Education Research</i>, 4(2), 020106. doi:10.1103/PhysRevSTPER.4.020106</p> <p>Handler, A., & Duncan, K. (2006). Hammerhead Shark Research Immersion Program: Experiential Learning Leads to Lasting Educational Benefits. <i>Journal of Science Education and Technology</i>, 15(1), 9–16.</p>
2	1/30	Research Design, Measures, and Sampling – <i>guest lecture for part of class</i> Librarian presentation	<ul style="list-style-type: none"> Read <i>Research Design</i> Bring research idea for feedback Conducting the literature search for DBER
3	2/6	IRB and developing measures Attend LA seminar and present	<ul style="list-style-type: none"> IRB Citi training certificate due; includes completion of the social science module – NOTE: Instructor will look at research topics on 1/30 and will coordinate—per a request from HSRB—projects

			<ul style="list-style-type: none"> with similar methods for group applications when the research is similar between projects. IRB application due
4	3/27	Analysis and Writing Results	<ul style="list-style-type: none"> Data collection complete Pre-draft of mini-paper due Poster workshop attended outside of class in collaboration with <i>Students as Scholars</i> Faculty mentor formative evaluation due (emailed to instructor)
5	4/17	Presenting Research in Multiple Formats	<ul style="list-style-type: none"> Draft mini-paper due
6	5/1	Poster Presentations (with LA seminar)	<ul style="list-style-type: none"> Final paper and poster presentation due Faculty mentor summative evaluation due (emailed to instructor)

Description of Assignments

CITI IRB Training Certificate

CITI training is necessary in order to complete any research study that has to do with humans. It is required by IRB at the time of submission. This module will inform you about ethics related issues that relate to informed consent and other matters. The basic training can be found at <https://www.citiprogram.org/>. Social science module must be completed as well. The certificate must be saved as a .pdf and uploaded on Blackboard as evidence of completion.

IRB Proposal

All projects must be submitted to GMU's Institutional Review Board (IRB). You will follow IRB guidelines and complete the entire application process since you are conducting research that will ideally be shared with a broader audience outside of this class. You can find the application forms, guidelines, addenda, and other necessary documents on GMU's IRBNet online at <http://oria.gmu.edu/irbnet/>. To complete this assignment, you will need to upload (1) the draft proposal that you submit to IRB, (2) the final proposal that is authorized by IRB, and (3) the letter from IRB approving your study.

After consultation with GMU's IRB, the instructor may request students to work together in groups on a common IRB application, providing the research is similar, especially with the possibility of common consent forms and data collection methods between some projects. Working with another student to submit an IRB is at the discretion of the course instructor, and will mean a division of labor to complete the IRB application. The course instructor will moderate the workload and will meet with any groups of students to coordinate responsibilities.

Mini-paper

Students will be required to submit a mini-paper about the discipline-based education research (DBER) they performed. An appropriate target journal for the research should be chosen. This will dictate the guidelines of the paper. Submitting the paper for conference presentation and/or publication is encouraged (and recommended), but not required for this course.

Poster Presentation

All students enrolled in the course will be required to create a research poster that reflects their semester of work. These will be presented during the last class meeting, and the audience will include all students enrolled in this class, first-semester Learning Assistants, and other faculty.

DBER Responses

Each student is responsible for attending a minimum of **three** DBER presentations sponsored by the STEM Accelerator throughout the course. After attending, students must post on the Blackboard discussion board and respond to two other classmates. Each assignment will be worth 25 points for a total of 75. Some guiding questions are as follows:

- What did you learn?
- How is this applicable to your research?
- Is there anything you would have changed about your research design if you had seen this presentation prior to the start of the course?

Class Participation

10 points per session. With explicit permission from the instructor, an alternative assignment for missing a class may be designed by the instructor, if there is good reason for missing the course. The alternative assignment would have similar goals as covered in the missed class and will require a similar time commitment of having attended the class. (For example, the student may need to attend an additional DBER seminar or other seminar, and write a one-page summary about the event.)

Faculty Mentor Evaluations

This will be a one page formative evaluation (completed by the mentor in the middle of the semester) that addresses three questions and a one page summative evaluation (completed by the mentor at the end of the semester) that addresses the same questions:

- 10 points: Is the student advancing to apply appropriate scholarly conventions during scholarly inquiry? Please describe.
- 10 points: Is the student applying appropriate scholarly conventions when reporting or performing? Please describe.
- 10 points: Is the student assessing the validity of key assumptions and evidence? Please describe.

The Faculty Mentor will assign the number of points the student earns as the research progresses, for both the summative and formative evaluations.
