WINONA STATE UNIVERSITY
REQUIRED CHECKLIST FOR ALL CURRICULAR PROPOSALS

Course or Program: GEOS 470 Geological Research Strategies

This checklist enables A2C2 representatives to endorse that their departments have accurately followed the Process for Accomplishing Curricular Change. For each course or program proposal submitted to A2C2, this checklist must be completed, signed by the submitting department's A2C2 representative, and included with the proposal when forwarded for approval. Peer review of proposals is also strongly advised, e.g., departments should discuss and vote on the proposals as submitted to A2C2, rather than on just the ideas proposed or drafts of proposals.

If a proposal fails to follow or complete any aspect of the process, the Course and Program Proposal Subcommittee will postpone consideration of the proposal and return it to the department's A2C2 representative for completion and resubmission. Resubmitted proposals have the same status as newly submitted proposals.

Note: This form need not be completed for notifications.

1. The appropriate forms and the “Approval Form” have been completed in full for this proposal. All necessary or relevant descriptions, rationales, and notifications have been provided.
   ______ Completed

2a. The “Financial and Staffing Data Sheet" has been completed and is enclosed in this proposal, if applicable.
   ______ Completed ______ NA

2b. For departments that have claimed that “existing staff" would be teaching the course proposed, an explanation has been enclosed in this proposal as to how existing staff will do this, e.g., what enrollment limits can be accommodated by existing staff. If no such explanation is enclosed, the department's representative is prepared to address A2C2's questions on this matter.
   ______ Completed ______ NA

3. Arrangements have been made so that a department representative knowledgeable of this proposal will be attending both the Course and Program Proposal Subcommittee meeting and the full A2C2 meeting at which this proposal is considered.
   ______ Completed
   Name and office phone number of proposal's representative: ________________________________

4. Reasonable attempts have been made to notify and reach agreements with all university units affected by this proposal. Units still opposing a proposal must submit their objections in writing before or during the Course and Program Proposal Subcommittee meeting at which this proposal is considered.
   ______ Completed ______ NA

5. The course name and number is listed for each prerequisite involved in this proposal.
   ______ Completed ______ NA

6. In this proposal for a new or revised program (major, minor, concentration, etc.), the list of prerequisites provided includes all the prerequisites of any proposed prerequisites. All such prerequisites of prerequisites are included in the total credit hour calculations.
   ______ Completed ______ NA

7. In this proposal for a new or revised program, the following information for each required or elective course is provided:
   a. The course name and number.
   b. A brief course description.
   c. A brief statement explaining why the program should include the course.
   ______ Completed ______ NA

8. This course or program revision proposal:
   a. Clearly identifies each proposed change.
   b. Displays the current requirements next to the proposed new requirements, for clear, easy comparison.
   ______ Completed ______ NA

9. This course proposal provides publication dates for all works listed as course textbooks or references using a standard form of citation. Accessibility of the cited publications for use in this proposed course has been confirmed.
   ______ Completed ______ NA

__________________________________________________ ______________________
Department's A2C2 Representative or Alternate   Date                              [Revised 9-05]
Routing form for new and revised courses and programs. Course or Program: **GEOS 470 Geological Research Strategies**

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[Revised 9-05]
WINONA STATE UNIVERSITY
PROPOSAL FOR NEW COURSES

Refer to Regulation 3-4, Policy for Changing the Curriculum, for complete information on submitting proposals for curricular changes.

GEOS 470  
Geologic Research Strategies  
2

Course No.  Course Name  Credits

This proposal is for a(n)  Undergraduate Course  Graduate Course

Applies to:  Major  Minor  University Studies*

Required  Required  Not for USP

Elective  Elective

Prerequisites  Instructor’s Permission

Grading method  Grade only  P/NC only  Grade and P/NC Option

Frequency of offering  Every Semester according to student demand

*For University Studies Program course approval, the form Proposal for University Studies Courses must also be completed and submitted according to the instructions on that form.

Provide the following information:

A. Course Description
   1. Catalog description.
   2. Course outline of the major topics and subtopics (minimum of two-level outline).
   3. Instructional methods utilized. Please indicate the contributions of lectures, laboratories, web-based materials, internships, and other instructional methods to this course.
   4. Course requirements (papers, lab work, projects, etc.) and means of evaluation.
   5. Course materials (textbook(s), articles, etc.).
   6. List of references.

B. Rationale
   1. Statement of the major focus and objectives of the course.
   2. Specify how this new course contributes to the departmental curriculum.
   3. Indicate any course(s) which may be dropped if this course is approved.

C. Impact of this Course on other Departments, Programs, Majors, or Minors
   1. Does this course increase or decrease the total credits required by a major or minor of any other department? If so, which department(s)?
   2. List the department(s), if any, which have been consulted about this proposal.

Attach a Financial and Staffing Data Sheet.

Attach an Approval Form with appropriate signatures.

Department Contact Person for this Proposal:

Toby Dogwiler  x5267  tdogwiler@winona.edu

Name (please print)  Phone  e-mail address

Form Revised 4-13-05
Include a Financial and Staffing Data Sheet with any proposal for a new course, new program, or revised program.

Please answer the following questions completely. Provide supporting data.

1. Would this course or program be taught with existing staff or with new or additional staff? If this course would be taught by adjunct faculty, include a rationale.

GEOS 470 will be taught by existing staff.

2. What impact would approval of this course/program have on current course offerings? Please discuss number of sections of current offerings, dropping of courses, etc.

Currently, three of our major tracks require a research project. This course will help us accommodate the growing research load demand in the department. GEOS 470 will become part of the elective pool and will rotate in as needed—as with other electives. Thus, other electives may be offered less frequently.

3. What effect would approval of this course/program have on the department supplies? Include data to support expenditures for staffing, equipment, supplies, instructional resources, etc.

This course will not have an impact on departmental supplies.

[Revised 9-05]
New Course Proposal

A. Provide a description of the course.

1. GEOS 470 Geological Research Strategies—2 S.H.
Instruction in designing, planning, and conducting geological research. Students will gain experience in background research using scientific literature, writing a research proposal, planning a research budget, project management, data quality control and assurance procedures, conducting field and laboratory research, and setting realistic goals and deadlines for project completion. Course activities and lectures will be adapted to specific student projects. Some lecturing, but the course delivery style will emphasize the value and importance of peer-to-peer review, discussion, and collaboration in completing scientific research. Normally taken before or simultaneously with GEOS 400. Prerequisite: Instructor’s permission. Offered each semester, subject to sufficient student interest.

2. Example Syllabus

GEOS 470 Geological Research Strategies
Tuesday 8:00-9:30 AM
2 credits

Instructor
Dr. Toby Dogwiler, Maxwell 134, 457-5267, tdogwiler@winona.edu

Purpose of Course
Generally, students will enter GEOS 470 with a tentative research topic that has been identified in coordination with the instructor. GEOS 470 is designed to prepare students for a robust directed research experience. Normally, GEOS 470 will be taken simultaneously with, or prior to, GEOS 400 Directed Research. GEOS 470 bookends the research experience opposite of GEOS 475 which focuses on the scientific communication strategies employed to present the results of one’s research. GEOS 470 also provides an opportunity for research students to support and interact with one another.

Course Philosophy
Successful scientific research involves multiple steps including identification of a problem, formulation of a hypothesis, background research, development of a research methodology, proposal preparation, budget planning, conducting the research, and writing a report which is often intended for publication in an appropriate journal. Furthermore, it is critical that all of these steps be integrated within a project management plan that includes realistic goals for project completion and procedures for data quality assurance and quality control. All scientific research is a collaborative effort. Many times this involves multiple investigators working together on a single common project. In all cases, informal discussions, peer-review, and evaluation by “disinterested” experts is involved in the research steps listed above.

Instructional Plan
In this course we will model the successful planning and implementation of a research project. Students will learn by “doing”. Under the guidance and advice of the instructor each student will initiate and plan a research project. Weekly meetings will feature “research group” discussions where students present their evolving work and ideas to each other and solicit feedback, advice, and guidance from the other students and the instructor. By the end of the course students will have accomplished many of the steps outlined above and be well-positioned to complete the actual field or lab component of the research in the GEOS 400 Directed Research course. Although the course will be primarily driven by group discussion and hands-on activities, limited lecturing will be used to cover the material listed in the course outline.
Literature (Required Texts will Vary by Instructor)

Resources:

Required Reading:
Students will complete extensive reading of the scientific literature related to their research project.

Assessment
Annotated Bibliography
Students will compile an annotated bibliography of the directed reading they complete during the background research related to their project. Details and requirements will be provided in a separate assignment description early in the semester.

Research Proposal
Students will prepare a research proposal describing the research and justifying its value to the discipline. The format of the proposal will vary in accordance with the requirements of internal or external funding agencies. Generally, it will be expected that the proposal will be submitted for funding after completion. The proposal must include a budget and project plan including a timeline. Details and requirements will be provided in a separate assignment description early in the semester.

Project Management Plan
Often in research proposals there is not space within the format to fully develop a project management plan. Thus, this assignment will expand on the project management aspects of the proposal. The project management plan will typically include a detailed timeline for completion of various steps, deadlines, and quality control and quality assurance of collected data. Part of the grade for this assignment will be based on keeping to the timeline and deadlines agreed upon (between each student and the instructor) in the project management plan. If the fieldwork, lab work, or report preparation extends beyond the semester in which GEOS 470 is taken, deadlines for those elements will not count against the semester grade. Details and requirements will be provided in a separate assignment description early in the semester.

Discussion Participation and Peer Review Activities
As discussed in the course philosophy and instructional plan, weekly research group discussions and peer-review of research efforts is an important form of collaboration. Each student will be expected to fully contribute to group discussion of research progress and ideas. Additionally, students will be evaluated based on the quality of the peer-reviews they complete.

Course Outline

I. Applying the Scientific Method to Geological Research
   i. Conducting background research on a geological problem
   ii. Developing ideas into hypotheses
   iii. Identifying methodologies that will test the hypotheses of your research
   iv. Analyzing data
   v. Building strong interpretations through multiple lines of evidence

II. The Research Proposal
   i. Identifying the requirements of the funding agency
   ii. Elements of a strong proposal
   iii. Developing a budget
   iv. How to review and critique a proposal
III. Project Management
   i. Setting realistic goals and deadlines
   ii. Reporting and accounting for budget expenditures
   iii. Quality Assurance/Quality Control procedures

IV. Scientific Communication (Briefly). GEOS 475 will cover these topics in more detail.
   i. Reports
      1. Preparing journal manuscripts
      2. The peer-review process
   ii. Oral Presentations
   iii. Posters

Additional topics will be covered based on time, student projects, and other needs that arise.

3. Statement of the basic instructional plan and methods used.

GEOS 470 will model the successful planning and implementation of a research project. Students will learn by "doing". Under the guidance and advice of the instructor, each student will initiate and plan a research project. Weekly meetings will feature "research group" discussions where students present their evolving work and ideas to each other and solicit feedback, advice, and guidance from the other students and the instructor. By the end of the course students will have accomplished many of the steps outlined above and be well-positioned to complete the actual field or lab component of the research in the GEOS 400 Directed Research course. Although the course will be primarily driven by group discussion and hands-on activities, limited lecturing will be used to cover the material listed in the course outline.

4. Course requirements and means of evaluation

Students in GEOS 470 will be evaluated based on the following set of assignments. The precise details of these exercises will be based on the nature of the student research project and the funding agency to which the research proposal is submitted.

Annotated Bibliography 25%
   Students will compile an annotated bibliography of the directed reading they complete during the background research related to their project. Details and requirements will be provided in a separate assignment description early in the semester.

Research Proposal 40%
   Students will prepare a research proposal describing the research and justifying its value to the discipline. The format of the proposal will vary in accordance with the requirements of internal or external funding agencies. Generally, it will be expected that the proposal will be submitted for funding after completion. The proposal must include a budget and project plan including a timeline. Details and requirements will be provided in a separate assignment description early in the semester.

Project Management Plan 20%
   Often in research proposals there is not space within the format to fully develop a project management plan. Thus, this assignment will expand on the project management aspects of the proposal. The project management plan will typically include a detailed timeline for completion of various steps, deadlines, and quality control and quality assurance of collected data. Part of the grade for this assignment will be based on keeping to the timeline and deadlines agreed upon (between each student and the instructor) in the project management plan. If the fieldwork, lab work, or report preparation extends beyond the semester in which GEOS 470 is taken, deadlines for those elements will not count against the semester grade. Details and requirements will be provided in a separate assignment description early in the
Discussion Participation and Peer Review Activities 15%
As discussed in the course philosophy and instructional plan, weekly research group discussions and peer-review of research efforts is an important form of collaboration. Each student will be expected to fully contribute to group discussion of research progress and ideas. Additionally, students will be evaluated based on the quality of the peer-reviews they complete.

5. List of Course Materials

The books offered below are representative of the texts that different faculty members may require. Much of the reading for the course will be related to each student’s background research and reading of the scientific literature related to her specific project.

Literature
Resources:

Required Reading:
Students will complete extensive reading of the scientific literature related to their research project.

6. Bibliography

See above. Each student will do extensive exploration and reading of the scientific literature related to their research project. The instructor will review and guide each students reading through periodic update and examination of the Annotated Bibliography described above.

B. Provide a rationale for the new course.

1. Statement of major focus and objectives for the course.

Successful scientific research involves multiple steps including identification of a problem, formulation of a hypothesis, background research, development of a research methodology, proposal preparation, budget planning, conducting the research, and writing a report which is often intended for publication in an appropriate journal. Furthermore, it is critical that all of these steps be integrated within a project management plan that includes realistic goals for project completion and procedures for data quality assurance and quality control. All scientific research is a collaborative effort. Many times this involves multiple investigators working together on a single common project. In all cases, informal discussions, peer-review, and evaluation by “disinterested” experts is involved in the research steps listed above.

GEOS 470 will guide students through the development of a research project from the initial identification of a problem through the initial stages of data collection and analysis. Students completing the course will have developed skills in proposal preparation, project management, and
2. **Statement specifying how this course will contribute to the departmental curriculum**

GEOS 470 will complement the experiences of GEOS 400 Directed Research and GEOS 475 Geoscience Seminar by providing a vehicle for guiding students through the early stages of research project development. Currently, this tends to be done one-on-one between each Geoscience student undertaking directed research and the research advisor. Consolidating and formalizing this instruction into a course will allow more efficient use of faculty time and capitalize on the opportunities for peer-review and collaboration among the cohort of research students.

3. **Course which may be dropped, if any, if this course is implemented**

No courses will be dropped if this course is approved.

C. **Provide a statement of the impact of this course on other departments, programs, majors, and minors**

1. **Clearly state the impact of this course on courses taught in other departments. Does this course duplicate the content of any other course? Is there an effect on prerequisites?**

This course will not impact courses taught in other departments. The course will not duplicate the content of any other course. The only prerequisite for this course is instructor’s permission. However, this an upper-level elective designed specifically for students beginning their research experience.

2. **Would approval of this course change the total number of credits required by any major or minor of any department?**

This course will not be required in any track of the Geoscience major. The course will be added to the Geoscience elective pool, but will not cause any students to have to take additional credits toward the completion of the major.

3. **If this course has an impact on the major or minor of any other department or any program....**

This course will not impact any other majors, minors, departments, or programs.

D. **If this course is being submitted for inclusion in the US program....**

At this time, the Geoscience department does not anticipate submitting this course for University Studies approval.