08-35

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Curriculum Proposal

Please type or select the requested information. Print completed forms, add appropriate paper attachments, and route through MSU's curricular process for recommendations and decisions.

College: Science, Engineering and Technology
Department: Physics and Astronomy
Program:
Type of Change Proposed: PROGRAM PROPOSALS — Change in Requirements-Course(s) Added
Title Current: Bachelor of Science Teaching Physics
Title Proposed: Bachelor of Science Teaching Physics
24-Char. Abbrev:

(Check all that apply):
☒ Undergraduate
☐ Graduate
CIP #

Proposal # 75
Effective Date of Change:
Academic Year 07-08
(For Office Use Only)

Course Designator and Number	Number of Credits

(if applicable)

Include a course or program description for the Bulletin (30-40 words maximum for courses, 100 for programs):

attached

Rationale or Justification for change:

The Department of Physics and Astronomy is making a change from a two-semester calculus based general physics sequence to a three semester general physics sequence. This sequence is an option within the BST-Physics degree program, and so the program must be modified to reflect this change. As the content of this sequence is unchanged, the impact on the program is small. Therefore the existing learning outcomes and assessment plan remains unchanged.

For General Education or Cultural Diversity Courses Only

General Education Course:

GE Category #	GE Category Name (Maximum of 3 Categories)
	N/A
	N/A
	N/A

? For Writing Intensive Courses, attach a description of the kind and quantity of writing.
? For Upper Division Courses, include a description of the respects in which it is broad and general rather than narrow and specific, and so suitable as GE.

Cultural Diversity Course:

(Please check one.)

☐ **Core** (At least 75% devoted to topics of race, gender, sexual orientation, age, class, and disabilities as they occur in United States Society.)

☐ **Related** (At least 25% devoted to the above topics or to a global perspective on topics related to African American, Asian, Hispanic, and Native American inhabitants of the United States.)

Attach paper copies of the following:
a. Syllabus or course outline.
b. Course's student learning outcomes associated with each GE competency or CD designation.
c. List of strategies to be used to assess students' achievement of each GE competency or CD designation.

For New Courses

(Check all that apply:)
☐ Course is an elective.
☐ Course is required for program
☐ Pre- or Co-requisites:
☐ Other courses are being changed or eliminated. (Explain.)

Instructional Type: Lecture
Grading Format: ☐ Grade ☐ P/N

Course will be offered:
☐ Fall Semester
☐ Spring Semester
☐ Summer Session

☐ Course content or title is similar to courses in other departments. (Attach copy of letter of agreement with other program(s) contacted. Indicate the nature of the discussions and/or resolution of differences or potential conflicts.)

Attach paper copies of the following:
a. Syllabus or course outline.
b. Course's student learning outcomes.
c. A list of resources required to offer and support this course.
d. A description of how teaching this course will affect department staffing.
e. If 400/500 level course, an explanation of added expectations of graduate students.

Minnesota State University, Mankato

Curriculum Proposal

*****Signature Page*****

Department
✓ Recommended (Category/ies_____)
__ Not Recommended (Category/ies_____)
Department Chair — Date: 17 Oct. 2007
Comments:

College Curriculum Committee
X Recommended (Category/ies_____)
__ Not Recommended (Category/ies_____)
Committee Chair — Date: 10/30/07
Comments:

College Dean
✓ Recommended (Category/ies_____)
__ Not Recommended (Category/ies_____)
Dean — Date: 10/31/07
Comments:

General Education Subcommittee
__ Recommended (Category/ies_____)
__ Not Recommended (Category/ies_____)
General Education Subcommittee Chair — Date
Comments:

Undergraduate Curriculum and Academic Policy Committee
✓ Recommended (Category/ies_____)
__ Not Recommended (Category/ies_____)
UCAP Faculty Chair — Date: 12/10/07
Comments:

Faculty Association Graduate Committee
__ Recommended
__ Not Recommended
Faculty Association Graduate Chair — Date
Comments:

Graduate Dean
__ Recommended
__ Not Recommended
Graduate Dean — Date
Comments:

Academic Affairs Council
✓ Recommended (Category/ies_____)
__ Not Recommended (Category/ies_____)
Assistant Vice President — Date: 12/17/07
Comments:

Senior Vice President and Vice President for Academic Affairs
✓ Approved (Category/ies_____)
__ Not Approved (Category/ies_____)
Sr. Vice President / Vice Pres. Academic Affairs — Date: 12/18/07
Comments:

PHYSICS (9-12) BS TEACHING --PRESENT

Required General Education (3 credits)

Recommended General Education (22-23 credits)
Including MATH 121

Required General Science Core (31-33 credits)

Required Professional Education (30 credits)

Required for Major (Core, 21 Credits)
MATH 122 Calculus II (4)
PHYS 381 Tutoring Physics (2)
PHYS 435 Modern Physics I (3)
PHYS 436 Modern Physics II (3)
PHYS 465 Computer Applications in Physics (3)
PHYS 482 Teaching Methods and Materials in Physical Science (4)
PHYS 493 Undergraduate Research (2)

Electives (Minimum of 8 Credits)*
Students may use Physics 221 and 222 to fulfill their Physics Electives requirement **only if** Physics 211 and 212 are completed successfully.

Alternatively, students with a strong interest in applying advanced mathematical skills to problems in physics are encouraged to choose a minimum of 8 credits* of higher level Physics or Mathematics as approved by the student's advisor to fulfill the Physics Elective requirement.

*This is reduced to 6 credits if Physics 221 and 222 have been taken in place of 211 and 212 in partial fulfillment of the General Science Core requirements.

PHYSICS (9-12) BS TEACHING --PROPOSED

Required General Education (3 credits)

Recommended General Education (22-23 credits)
Including MATH 121

Required General Science Core (31-33 credits)

Required Professional Education (30 credits)

Required for Major (Core, 21 Credits)
MATH 122 Calculus II (4)
PHYS 381 Tutoring Physics (2)
PHYS 435 Modern Physics I (3)
PHYS 436 Modern Physics II (3)
PHYS 465 Computer Applications in Physics (3)
PHYS 482 Teaching Methods and Materials in Physical Science (4)
PHYS 493 Undergraduate Research (2)

Electives (Minimum of 8 Credits)*
Students may use Physics 221, 222, 232, 223, and 233 to fulfill their Physics Electives requirement **only if** Physics 211 and 212 are completed successfully.

Alternatively, students with a strong interest in applying advanced mathematical skills to problems in physics are encouraged to choose a minimum of 8 credits* of higher level Physics or Mathematics as approved by the student's advisor to fulfill the Physics Elective requirement.

*This is reduced to 4 credits if Physics 221, 222, 232, 223, and 233 have been taken in place of 211 and 212 in partial fulfillment of the General Science Core requirements.

Department of Physics and Astronomy
Minutes of Meeting
Friday Oct 12, 2007, 4:00 PM Trafton, E-210

Present: T. Brown, P. Eskridge, R. Herickhoff, S. Kipp, I. Kogoutiouk, R. Palma, M. Pickar (presiding), J. Pierce, A. Roberts, L. Schwartzkopf, H. Wu, Y. Xu

1. Minutes of the department meeting of 10/5/07 was approved with the change of date.

2. Announcements:
   a. Y. Xu submitted a Faculty Research Grant proposal.
   b. Power in the Trafton building will be turned off early morning on Friday, Oct. 26th. Faculty need to turn their computer off when leaving on Thursday, Oct. 25th.
   c. Wiley's sales representative will be holding a workshop for the new Wiley Plus. L.Schwartzkopf, R. Palma, I. Kogoutiouk, H. Wu and Y. Xu are interested. A date for the workshop will be set.
   d. M. Pickar reminded the department that on Oct. 20th CSET will have open house activities for the Family Weekend.
   e. There is a new administrative drop policy. Faculty who want an administrative drop for their classes must apply every year. No one in the department sees a need for it.
   f. MS Office 2007 is not installed on most of the computers in the department. When outside speakers come and need to use our computers for their presentations, a document written in MS Office 2007 will need to be converted. Software is available on the Microsoft website.
   g. R. Palma asked faculty to tell their student to come to the weekly seminars.
   h. M. Pickar announced the results of the Iowa State Speakers' Bureau runoff vote, and gave the results to R. Palma to pursue.

3. T. Brown distributed revised requirements for B.S. Physics Teaching. P. Eskridge moved, R. Palma seconded to approve the revised requirement. Motion carried unanimously.

4. The Fall 2008 teaching schedule for both physics and astronomy were distributed and discussed. We will be offering the old Phys 222 in the Fall of 2008 to allow students who took Phys 221 in the Spring of 2008 to finish the sequence. But Phys 221 in the Fall of 2008 will be the new 4 credit hour course. Starting in the Spring of 2009, all General Physics courses will be the ones in the new sequence. R. Herickhoff moved, I. Kogoutiouk seconded to approve the physics teaching schedule for the Fall of 2008; J. Pierce moved, P. Eskridge seconded to approve the astronomy teaching schedule for the Fall of 2008, both motions were passed unanimously.

5. The teaching schedule for Spring of 2009 was discussed. It will be modified and presented to the department later. Since we will have three faculty on sabbatical leave that semester, some classes may have to be canceled. Faculty should survey students in their classes to find out how many students are going to take Phys 475 in the Spring of 2008. T. Brown will check with Jeff Pribyl about the offering of Phys 482.

Meeting adjourned at 5:00 PM.

Respectively submitted,
Youwen Xu.

Learning Outcomes:

The learning outcomes for the 9-12 Physics license are established by the Minnesota Board of Teaching Physics Licensure standards and competencies. The standards matrix for the 9-12 Physics license can be viewed at:
http://ed.mnsu.edu/professionaled/matrices/subject.html

In addition the Department of Physics and Astronomy has identified the following learning outcomes for the BST-Physics program

Students should have:

1. a rich understanding of the basic principles of classical physics.
2. the ability to effectively communicate these principles to physics students.
3. the ability to recognize the physical principles responsible for everyday phenomena.
4. knowledge of the fundamental theories and the unanswered questions of modern physics.
5. knowledge of the mathematics used to frame and solve problems in physics.
6. the ability to frame and solve simple mathematical problems about everyday phenomena and about modern physics.
7. knowledge of the experiments which are the basis of our knowledge of classical and modern physics.
8. the ability to analyze and interpret experimental results.
9. an understanding of, and the ability to use, computers for obtaining and analyzing data.
10. the ability to design experiments to test hypotheses and/or to estimate model parameters.

Assessment Plan

The program evaluation system for the College of Education will serve as the primary internal process to review and update the quality of these services. That plan, specified for as part of the MnBOT approved plan for Standard 2 from the NCATE Accreditation, is noted below. It is then followed by the description of the approved Transition steps for the DCD Program of Study, as noted in the Undergraduate Bulletin Description for this major (COE approved, December 2004).

Data Collection, Analysis, and Evaluation

Unit-level data from several sources is regularly aggregated, analyzed by program, and disseminated for faculty and deans. Performance data on clinical experiences and student teaching for initial licensure candidates is compiled in an annual internal report and distributed. Similarly, data on candidates' performance on Praxis examinations is analyzed and disseminated. Finally, responses to follow-up surveys are analyzed and disseminated. Department-level data is compiled and analyzed for annual program assessment reports.

Currently, the unit is making a transition from a department-maintained data management system to unit-level Professional Education Database. The Professional Education Database, under development since fall 2002, and in production in fall 2004 with version 2.0, enables the unit to manage and monitor assessment data for students in both initial and advanced programs. The database is designed to incorporate data from the various sources at the university and unit into one integrated system to track candidates' progress as well as reveal a program's strengths and weaknesses. The Professional Education Database draws information directly from the MSU student records system (ISRS) so that candidate information is up to date. Beginning with tracking the clinical experience data for undergraduate programs, the database incorporated other types of information as it was developed. Performance data are being collected, as shown in Standard 1, and are being used to make decisions about candidates at the four transition points for initial and advanced programs. With the Professional Education Database in full production, faculty are able to electronically input assessment data related to clinical experiences and core assessments. Faculty will be entering data directly in fall 2004 for the first time. The database allows queries to be made at the unit, program, and course levels. This access to data about trends will guide faculty as they strive to improve programs. The table below shows the sources of data, who they are collected from, and whether they are part of the database. These sources of data are regularly reviewed and used to make decisions about the functioning of unit and program improvement.

Reports of unit-wide assessments including data related to candidate testing and student teaching are distributed to unit faculty and deans as well as the Office of Academic Affairs. In addition to dissemination among unit faculty, departments, and deans, several advisory groups review the data and make recommendations. Aggregate data is reported by program to facilitate decision-making.

The Professional Education Assessment Committee meets to examine unit data at both initial and advanced levels and makes recommendations to improve assessments. These assessments include student teaching and clinical experience evaluations, dispositions assessments, Praxis examinations, follow-up surveys of graduates and employers, and program level core assessment rubrics.

The Professional Education Advisory Council receives information about assessments that reveals patterns of candidate performance. Based on this assessment information, the council recommends ways to better meet the needs of schools and learners.

The College of Education Student Advisory Council provides feedback to the student relations coordinator, Dean, and departments.

Changes to programs within courses or emphases within programs can be acted upon at the department level without formal university approval. Unit level changes related to assessments, clinical experiences, and admission and retention policies involve consultation with

advisory groups, department chairs, unit faculty, and the Dean. The advisory groups include P-12 partners, faculty representatives, and candidates. The curriculum change process is initiated by department faculty, with proposed changes receiving approved first at the department level. Curriculum proposals then go to the college for approval by a college curriculum committee and the dean. From the college level, proposals move to the university level where they are simultaneously acted upon by faculty representatives from each college on the University Curriculum and Policy Committee and the Vice President of Academic Affairs. When faculty and administration decisions differ, the issue is resolved during Sub-Meet and Confer. Program changes and new programs must also be approved by the Office of the Chancellor of Minnesota State Colleges and Universities and the Board of Trustees. For a detailed description of the curriculum process, go to http://www.mnsu.edu/acadaf/html/currformsprocesses.htm.

MSU requires that every program submit an annual assessment report for review by Academic Affairs as part of the Higher Learning Commission process. The report, based on a plan each program has on file as part of the program review process, lists student outcomes and assessments. Results of assessments, analysis identifying strengths and weaknesses, and resulting changes to improve programs are components of the report. Each report is rated and the feedback returned to the dean and departments.