

10-25-1993

Curriculum Revision Proposal for Physics Department

The College at Brockport, College Senate

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Resolution # 5 1993-94



TO: President John E. Van de Wetering
FROM: The Faculty Senate Meeting on 10/25/93
(Date)

RE: I. Formal Resolution (Act of Determination)
II. Recommendation (Urging the fitness of)
III. Other (Notice, Request, Report, etc.)
For your information

SUBJECT: Curriculum Revision Proposal for Physics Department

Signed [Signature] Date Sent 11/9/93
(For the Senate)

TO: The Faculty Senate
FROM: President John E. Van de Wetering

RE: I. Decision and Action Taken on Formal Resolution
a. Accepted. Effective Date Fall 94
b. Deferred for discussion with the Faculty Senate
on _____
c. Unacceptable for the reasons contained in the
attached explanation

II, III.

a. Received and acknowledged
b. Comment:

S.U.N.Y.
COLLEGE AT BROCKPORT
NOV 22 1993

FACULTY SENATE
BROCKPORT, NY 14420

DISTRIBUTION: for full proposal, contact
Faculty Senate office
See attached list

Distribution Date 11/15/93 Signed: [Signature]
(President of the College)

October 12, 1993

Curriculum Revision Proposal for Faculty Senate

The Department of Physics is proposing major revisions in (a) the requirements for a major in physics, (b) the file of physics courses and (c) the content of certain courses within the file. The proposed revisions have been motivated by the recommendations made by External Program Reviewers in the Spring of 1991 and by the addition to the department of two young faculty. We anticipate that the new program will better serve not only physics majors but also students who major in other natural sciences. We feel that our present contribution to General Education, through General Astronomy (AST 201) an "L course," College Physics I (PHS 201) an "L" course, General Physics I (PHS 115) an "L" course and The Cosmic Onion (AST 302), an "I course," is strong.

The improvements in the physics major will be: (1) A smoother transition from the introductory sequence, College Physics I and II, to the upper division courses, (2) More emphasis on advanced laboratory and computational experiences, (3) Modernization of present course content, and (4) Strengthening of the Astronomy Track. Non-physics majors will have better access to the introductory courses and will find the level and content of those courses more appropriate to their majors.

Students who major in another discipline will have both College Physics I and II (calculus based) and General Physics I and II (algebra based) available with and without laboratory. Previously only General Physics had that option. Majors in other sciences usually have large demands on their time due to required laboratories in their majors. We anticipate, that by offering College Physics without laboratory, students who normally would avoid the course due to time constraints now will take it. In addition, we are changing the co-requisites for College Physics I from Calculus II (MTH 202) to Calculus I (MTH 201) and for College Physics II from Calculus III (MTH 203) to Calculus II (MTH 202). This will make the mathematical level of the College Physics sequence appropriate for the wide range of students in those courses. Small but important changes in both General and College Physics will be to

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eliminate certain topics and cover others in more depth. This change addresses student concerns that "too much material is covered too quickly." Topics eliminated will be covered for physics majors in the new "bridge course," Classical Physics (PHS 300) and its associated laboratory (PHS 303). We feel other science majors will not only be more comfortable with the slower pace of the courses but will also be better prepared for application of physics in their majors.

The significant changes in the requirements for the physics major are: (1) The creation of a bridge course, Classical Physics (PHS 300) and its associated laboratory (PHS 303) which will treat topics eliminated in College Physics and introduce new topics required for 300 and 400 level physics courses. The mathematical level of PHS 300 will also be geared to prepare students for the rigorous mathematics required in upper division courses. (2) Increasing the credits in both PHS 307 and 308 from one to two. Both the level of and the time spent in the laboratories will increase. Students will gain experience in using sophisticated, modern equipment and experimental techniques. This will include learning how to interface computers with experiments. Further, students will have the opportunity to perform computational experiments in both physics and astronomy. (3) The modernization of the physics curriculum, which has already begun. Computers are being used to obtain and analyze data in both General and College Physics. This will be extended to Modern Physics Laboratory and Advanced Laboratories I and II. Non-linear dynamics has been introduced in Classical Mechanics as have fundamental computational techniques. This will feed into other upper division courses. Condensed Matter Physics will be developed as a new course in which students will learn the fundamentals of this relatively new, exciting branch of physics. (4) The strengthening of the Astronomy track through the requirements of a new course in Astrophysics plus Advanced Laboratories I and II. The department now has the expertise, facilities and some of the equipment to provide a high quality physics major with an emphasis on astronomy. In addition, the new Astrophysics course is an appropriate elective for physics and (advanced) chemistry majors.

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Certain shifts of credit and content will take place in the new curriculum: (1) The number of credits in the core increase from 22 to 26. This is due to the new bridge course and laboratory which were discussed earlier. (2) Electricity and Magnetism has been compressed from six credits (E&M I and II) to three credits (Electricity and Magnetism). We have been "plodding" through E&M for years; the course needs to be accelerated. While it is true that not all that was covered in PHS 305 and 314 can be accomplished in PHS 320, we feel that certain topics such as circuits and some areas of electro- and magneto-statics may be presented in courses where they are specifically required. Also, students will be better prepared for PHS 320 having taken the bridge course PHS 300. (3) In the Traditional Track the doubling of the time requirements for PHS 307 and 308 have already been discussed. We plan to have students perform four high-level experiments in both 307 and 308. They will be able to choose from a menu of 10-12 experiments and they will be expected to produce high-quality, comprehensive reports on their work. (4) In the 3+2 Engineering Program we have increased the credits from 31 to 34. With the improvement of PHS 307/308 it is okay to drop the Senior Project (PHS 402) requirement. (5) The Electronics Track has been dropped. We feel that the 3+2 Program in Electrical Engineering fills this need. We have kept the Circuit Theory and Electronics courses and laboratories as upper division electives. The new accredited computer science major has Circuit Theory as a science elective. (6) The Teacher Certification Track has been made identical to the Traditional Track. We have finally recognized that it does not make sense to graduate a prospective teacher with fewer requirements than that of a prospective professional physicist. (7) We have added Linear Algebra (MTH 424) to the required courses outside the physics department. This course supports many topics in upper division physics courses. We have also strengthened the computer literacy requirement to consist of CSC 203 only. In this regard, we expect physics majors to be proficient in programming in "C" by their junior year. We will advise them on how to achieve this proficiency either by taking the sequence of courses (MTH 281 - CSC 205 - CSC 319) which gets them to "C" or by learning "C" on their own.

PHYSICS COURSE FILE

PROPOSED PHYSICS COURSE FILE

PHYSICS: (PHS)			P= prerequisite			C= corequisite		
111	General Physics I (L)	3 F	111	General Physics I	3 F	C-MTH 121		
112	General Physics II (L)	3 S	112	General Physics II	3 S	P-PHS 111 or PHS 115		
115	General Physics I w/Lab	4 F	115	General Physics I w/Lab (L)	4 F	C-MTH 121		
116	General Physics II w/Lab	4 S	116	General Physics II w/Lab (L)	4 S	P-PHS 111 or PHS 115		
201	College Physics I (L)	4 F	201	College Physics I w/Lab (L)	4 F	C-MTH 201		
202	College Physics II	4 S	202	College Physics II w/Lab	4 S	C-MTH 202, P-PHS 201 or 211		
			211	College Physics I	3 F	C-MTH 201		
			212	College Physics II	3 S	C-MTH 202, P-PHS 201 or 211		
			300	Classical Physics	3 F	C-MTH 203, P-PHS 202 or 212		
			303	Classical Physics Lab	1 F	C-PHS 300		
301	Math Methods of Physics	3 F,S	301	Math Methods of Physics	3 F	P-MTH 202, PHS 202 or 212		
*302	Classical Mechanics	3 S	302	Classical Mechanics	3 S	P-PHS 301, PHS 300		
	*previously PHS 312 Mechanics II							
305	Electricity and Magnetism I	3 S						
306	Circuits Laboratory	1 TBA	306	Circuits Laboratory	1 TBA	C-PHS 309		
307	Physical Measurements Lab I	1 F	307	Advanced Laboratory I	2 F	P-PHS 202		
308	Physical Measurements Lab II	1 S	308	Advanced Laboratory II	2 S	P-PHS 202		
309	Circuit Theory	3 TBA	309	Circuit Theory	3 TBA	C-PHS 301		
310	Electronics Laboratory	1 TBA	310	Electronics Laboratory	1 TBA	C-PHS 311		
311	Electronics	3 TBA	311	Electronics	3 TBA	P-PHS 309		
314	Electricity and Magnetism II	3 F						
315	Statics	3 F	315	Statics	3 F	P-PHS 301		
	*previously PHS 304 Mechanics I							
*317	Modern Physics	3 F	317	Modern Physics	3 S	P-PHS 300		
	*previously 209							
*318	Modern Physics Laboratory	1 S	318	Modern Physics Laboratory	1 S	C-PHS 317		
	*previously 208							
399	Independent Study	1-6 TBA	399	Independent Study	1-6 TBA	P-PHS 300, PHS 301		
401	Senior Seminar	1 S	401	Senior Seminar	1 S	P-Instructor's permission		
402	Senior Project	1-3 F,S	402	Senior Project	1-3 F,S	P-Senior Status		
411	Quantum Mechanics	3 S	411	Quantum Mechanics	3 S	P-PHS 302, PHS 317		
412	Physical Electronics	3 S						
413	Thermodynamics & Stat. Mech.	3 F	413	Thermodynamics & Stat. Mech.	3 F	P-PHS 302, PHS 317 or CHM 405, CHM 406		
414	Optics	4 S	414	Optics	4 S	P-PHS 320		
415	Condensed Matter Physics	3 TBA	415	Condensed Matter Physics	3 TBA	P-PHS 301, PHS 317		
499	Independent Study	1-6 TBA	499	Independent Study	1-6 TBA	P-Senior Status		
Astronomy: (AST)								
201	General Astronomy (L)	4 F,S	201	General Astronomy (L)	4 F,S	C-QWT 111		
*302	The Cosmic Onion (I)	3 F	302	The Cosmic Onion (I)	3 F	P-Junior Status		
	*New Fall '93							
399	Independent Study	1-6 TBA	399	Astrophysics	3 S	P-PHS 300, 317 or CHM 405		
499	Independent Study	1-6 TBA	499	Independent Study	1-6 TBA	P-Instructor's permission		
			499	Independent Study	1-6 TBA	P-Senior Status		

THE PHYSICS MAJOR

<u>PRESENT</u>	
201-202	8
301	3
302	3
305	3
317	3
318	1
401	1
<hr/>	
	22

CORE

<u>PROPOSED</u>	
201-202	8
300	3
303	1
301	3
302	3
317	3
318	1
320	3
401	1
<hr/>	
	26

<u>TRADITIONAL</u>	
307 or 308	1
314	3
402	1
411	3
300/400 electives	6
<hr/>	
	14
TOTAL:	36

<u>TRADITIONAL & TEACHER CERT.</u>	
307	2
308	2
402	1 (minimum)
411	3
300/400 elective	3
<hr/>	
	11
TOTAL:	37

3+2

307	1	
308	1	
315	3	
402	1	
300/400 elective	3	
<hr/>		
	9	(CSC 213 and MYH 451 are required for 3+2)
TOTAL:	31	

307 or 308	2
315	3
300/400 elective	3
<hr/>	
	8
TOTAL:	34

201	4
301	3
314	3
399	2
499	2
<hr/>	
TOTAL:	14
	36

ASTRONOMY

307	2
308	2
AST 401	3
PHS 413	3
AST 499	1 (minimum)
<hr/>	
TOTAL:	11
	37

TEACHER CERTIFICATION

307	1
308	1
402	1
300/400 elective	6
<hr/>	
TOTAL:	9
	31

TEACHER CERTIFICATION & TRADITIONAL

307	2
308	2
402	1
411	3
300/400 elective	3
<hr/>	
TOTAL:	11
	37

REQUIRED COURSES OUTSIDE THE DEPARTMENT

<u>PRESENT</u>		<u>PROPOSED</u>	
MTH 201	3	MTH 201	3
MTH 202	3	MTH 202	3
MTH 203	3	MTH 203	3
MTH 455	3	MTH 424 P-MTH 281	3
CEM 205	4	MTH 455	3
CEM 206	4	CEM 205	4
**CSC 212 or 203	3 or 4	CEM 206	4
		**CSC 203	4
<hr/>		<hr/>	
23 or 24		27	

**Satisfies computer lit.