

Bachelor of Arts in Physics – August, 2008

General Education Requirements (63 credits)		Hours
English	ENGL 101 AND ENGL 102 (OR 105) AND ONE of ENGL 203 , 205, 209, 210, or 211	9
Western Civil.	HWC 204 (OR 114) AND HWC 205 (OR 115)	6
Humanities	Three courses from the <i>Principal Course Distribution List</i> . For UKanTeach students, HIST 136 must fill the <i>Historical Studies</i> subgroup requirement	9
Social Science:	Three courses from the <i>Principal Course Distribution List</i>	9
Natural Science & Mathematics	CHEM 184 is recommended, as well as one course from Biological or Earth Science topical group (MATH 121 is explicitly required in mathematics requirements).	8
Oral Comm. & Logic	COMS 130 (131) or 230; PHIL 148 or 310 or COMS exemption/proficiency	3
Non-western Culture	From PCNW course list for CLAS requirements	3
Foreign Language	Level I, II, III and IV or proficiency	16

Foundational Physics & Mathematics (18.5 credits)		Hours
PHSX 150	Seminar in Physics, Astronomy & Engineering Physics	0.5
PHSX 211 or 213	General Physics I (213 is honors/majors equivalent)	4
PHSX 212 or 214	General Physics II (214 is honors/majors equivalent)	4
MATH 121	Calculus I	5
MATH 122	Calculus II	5

Advanced Physics requirements for major (20 credits, all jr/sr)		Hours
PHSX 313	General Physics III	3
PHSX 316	Intermediate Physics Lab (take with or after PHSX 313)	1
PHSX 511	Intro. Quantum Mechanics	3
PHSX 521	Mechanics I	3
PHSX 531	Electricity & Magnetism	3
PHSX 536	Electronic Circuit Measurement & Design	4
PHSX elective	Any physics lecture or laboratory course numbered 500 or higher	3

Advanced Mathematics requirements for major (8 credits, 0 to 3 at jr/sr level)		Hours
MATH 223	Vector Calculus	3
MATH 290	Elementary Linear Algebra	2
MATH 220 or 320	Elementary Differential Equations; MATH 320 is recommended for physics & astronomy majors	3

Additional Notes:

- 124 credits are required for graduation, of which 45 must be at junior/senior level (courses numbered 300 or higher). Specific requirements for this major comprise 109.5 credit hours, including 20 jr/sr credit hours (increased by 3 if MATH 320 is taken). Students must take 22 to 25 additional hours as electives at the jr/sr level to satisfy this regents' requirement.
- The department also offers a Bachelor of Arts in Computational Physics. These requirements are listed in the Undergraduate Catalog of the University.

With a few modifications, students earning a bachelor of arts in physics may qualify for licensure to teach at the time they graduate by following the UKanTeach curriculum. UKanTeach adds several pedagogic and a few general education requirements but is **otherwise indistinguishable** from other physics degrees, so students may feel equally well prepared for education, further research or study.

There are some specific differences:

- for the UKanTeach physics B.A. requirements the humanities general education requirement is as follows: TWO Courses from the *Principal Course Distribution List* (see the *Undergraduate Catalog*) AND HIST 136 Early Science to 1700 (OR Equivalent Approved by UKanTeach).
- Courses fulfilling general education requirements must be taken on a letter-grade basis by UKanTeach students.

Other requirements specific to UKanTeach licensure are:

PROFESSIONAL DEVELOPMENT COURSEWORK REQUIREMENTS: A minimum grade of C is required in all courses.		24
Liberal Arts & Sciences	LA&S 290 UKan 1	1
	LA&S 291 UKan 2	1
Curriculum & Teaching	C&T 360 Knowing and Learning in Science & Mathematics	3
	C&T 366 Classroom Interactions in Science & Mathematics	3
	C&T 448 Reading and Writing across the Curriculum	3
	C&T 460 Project-Based Instruction	3
	C&T 501 Student Teaching (6 hours) <i>Requires a 2.5 cumulative GPA in major and overall.</i>	6
	C&T 598 Special Topics Seminar	1
Research Methods	CHEM 598 or Equivalent course approved by UKanTeach in Major Field of Study	3

Suggested Schedule B.A. Physics

Fall Semester

Spring Semester

Freshman Year			
MATH 121, <i>Calculus I</i>	5	MATH 122, <i>Calculus II</i>	5
ENGL 101, <i>Composition</i>	3	ENGL 102, <i>Critical Reading & Writing</i>	3
PHSX 150, <i>Seminar in Physics & Astronomy & Engineering Physics</i>	0.5	PHSX 211/213, <i>General Physics I</i> (majors are encouraged to take 213)	4
CHEM 184, <i>Found. Chemistry I</i>	5	Elective/General Education	3
Elective/General Education	3		
	16.5		15

Sophomore Year			
PHSX 212 or 214, <i>General Physics II</i>	4	PHSX 313, <i>General Physics III</i>	3
Third English Course	3	PHSX 316, <i>Intermed. Physics Lab</i>	1
MATH 223, <i>Vector Calculus</i>	3	MATH 220 or 320, <i>Differential Equations</i>	3
MATH 290, <i>Linear Algebra</i>	2	Foreign Language II	5
Foreign Language I	5	Elective/General Education	3
	17		15

Junior Year			
PHSX 521, <i>Mechanics I</i>	3	PHSX 511, <i>Intro Quantum Mechanics</i>	3
Foreign Language III	3	PHSX 536, <i>Elect. Circuits Meast. & Dsgn</i>	4
Western Civ. I	3	Western Civ. II	3
Elective/General Education	6	Foreign Language IV	3
		Elective/General Education	3
	15		16

Senior Year			
PHSX 531, <i>Electricity & Magnetism</i>	3	Physics elective course	3
Non-western Culture course	3	Electives or General Ed.	12
Elective/General Education	9		
	15		15

Suggested Schedule B.A. Physics UKanTeach

Fall Semester

Spring Semester

Freshman Year			
MATH 121, <i>Calculus I</i>	5	MATH 122, <i>Calculus II</i>	5
ENGL 101, <i>Composition</i>	3	ENGL 102, <i>Critical Reading & Writing</i>	3
PHSX 150, <i>Seminar in Physics, Astronomy & Engineering Physics</i>	0.5	PHSX 211/213, <i>General Physics I</i> (majors are encouraged to take 213)	4
CHEM 184, <i>Found. Chemistry I</i>	5	PC I	3
LA&S 290, <i>UKan I</i>	1	LA&S 291, <i>UKan 2</i>	1
	14.5		16

Sophomore Year			
PHSX 212 or 214, <i>General Physics II</i>	4	PHSX 313, <i>General Physics III</i>	3
C&T 360, <i>Knowing & Learning</i>	3	PHSX 316, <i>Intermed. Physics Lab</i>	1
MATH 223, <i>Vector Calculus</i>	3	MATH 220 or 320, <i>Differential Equations</i>	3
MATH 290, <i>Linear Algebra</i>	2	Foreign Language II	5
Foreign Language I	5	C&T 366, <i>Classroom Interactions</i>	3
	17		15

Junior Year			
PHSX 521, <i>Mechanics I</i>	3	PHSX 511, <i>Intro Quantum Mechanics</i>	3
Foreign Language III	3	PHSX 536, <i>Elect. Circuits Meast. & Dsgn</i>	4
Western Civ. I	3	Western Civ. II	3
English elective	3	Foreign Language IV	3
C&T 448, <i>Reading & Writing</i>	3	PC II	3
	15		16

Senior Year			
PHSX 531, <i>Electricity & Magnetism</i>	3	PHSX elective	3
Non-western Culture course	3	C&T 501, <i>Student Teaching</i>	6
PC III	3	C&T 598, <i>Special Topics Seminar</i>	1
C&T 460, <i>Project-Based Instruction</i>	3	PC IV and V	6
CHEM 598, <i>Research Methods</i>	3		
	15		16

One principal course must be met through summer study or additional hours in one of these semesters.

Bachelor of Science in Physics

General Education Requirements (27 credits)		Hours
English	ENGL 101, ENGL 102 (OR 105), and ONE of ENGL 203 , 205, 209, 210, 211, or 362	9
Western Civil.	HWC 204 (OR 114) and HWC 205 (OR 115)	6
Humanities	Two Courses, one MUST be from the <i>Principal Course Distribution List</i> (this requirement is slightly modified for students in the UKanTeach program)	6
Social Science:	TWO Courses, one MUST be from the <i>Principal Course Distribution List</i>	6

Foundational Physics & Mathematics (18.5 credits)		Hours
PHSX 150	Seminar in Physics, Astronomy and Engineering Physics	0.5
PHSX 211 or 213	General Physics I (213 is honors/majors equivalent)	4
PHSX 212 or 214	General Physics II (214 is honors/majors equivalent)	4
MATH 121	Calculus I	5
MATH 122	Calculus II	5

General Science Requirements (8 to 9 credits)		Hours
Chemistry	CHEM 184 (or 185) Foundations of Chemistry	5
Computer Sci.	EECS 138 (3), Intro. to Computing or EECS 168 (4) Programming I Fortran or C++ are accepted languages for EECS 138	3-4

Advanced Mathematics (11 credits)		Hours
MATH 223	Vector Calculus	3
MATH 290	Elementary Linear Algebra	2
MATH 320	Elem. Differential Equations.	3
Math elective	ONE Course from the following list PHSX 518, 718, MATH 465, 526, 530, 558, 581, 590, 628, 646, 647, 648, 660, 661, OR any 700-level MATH lecture course except for MATH 701 and 715.	3

Advanced Physics required for both options (24 credits)		Hours
PHSX 313	General Physics III	3
PHSX 316	Intermediate Physics Laboratory (with or after PHSX 313)	1
PHSX 511	Intro. Quantum Mechanics	3
PHSX 516 or 536	Physical Measurements or Electronic Circuits & Measurements	4
PHSX 521	Mechanics I	3
PHSX 531	Electricity & Magnetism	3
PHSX 671	Thermal Physics	3
PHSX elective	Any physics lecture or laboratory course numbered 500 or higher and not part of other specific requirements for the major.	3
PHSX research	PHSX 503, Undergraduate Research, or 501 (Honors). 1 credit is required for majors; more may be taken. More than 1 credit of research may be required for departmental honors	1

B.S. Physics candidates select one of the following options: pre-professional or interdisciplinary

Pre-Professional Option Requirements (13 credits)		Hours
PHSX 621	Mechanics II	3
PHSX 631	Electromagnetic Theory	3
PHSX 711	Quantum Mechanics	3
PHSX 516 or 536	Physical Measts. or Electronic Circuits & Measurements; students in this option track take both advanced laboratory courses	4

Interdisciplinary Option Requirements (12 to 15 credits)		Hours
PHSX	TWO of: PHSX 621, PHSX 631, PHSX 711, PHSX 516/536	6-7
Interdisciplinary science electives	Two semesters coursework in an allied science at 300-level or higher. Students must meet any prerequisites for these courses as part of elective hours. Courses approved to date are:	6-8
	CHEM 598, 622 or 646 (CHEM 598 open only to UKanTeach students)	

	BIOL 350, 400, 408, 412, 416, 600, 636, 638	
	GEOL 360, 562, 572, 575, 576, 577	

Additional Notes:

- Specific requirements for the physics B.S. comprise 101.5 to 102.5 credits for the pre-professional option, 100.5 to 104.5 credits for the interdisciplinary option, leaving 19.5 to 23.5 credits usable for elective courses; 124 credits are presently required for bachelors degrees.
- Specific requirements for this degree include 42 to 45 credit hours at the junior/senior level if MATH 320 is taken as recommended. A few additional hours of elective coursework at the junior/senior level must be included as electives to meet the separate requirement set by the Regents for 45 credit hours of junior/senior coursework.
- Students who wish to major in both physics and astronomy must meet the requirements of both degrees plus an additional requirements: 15 credits must be unique for each degree.

With a few modifications, students earning a bachelor of science in physics may qualify for licensure to teach at the time they graduate by following the UKanTeach curriculum. UKanTeach adds several pedagogic and a few general education requirements but is **otherwise indistinguishable** from a B.S. in physics, so students may feel equally well prepared for education, further research or study.

There are some specific differences:

- for the UKanTeach physics B.S. requirements the humanities general education requirement is as follows: ONE Course from the *Principal Course Distribution List* (see the *Undergraduate Catalog*) AND HIST 136 Early Science to 1700 (OR Equivalent Approved by UKanTeach).
- Courses fulfilling general education requirements must be taken on a letter-grade basis by UKanTeach students.
- An additional requirement is CHEM 598 Research Methods (**OR** Equivalent Course Approved by UKanTeach in Major Field of Study). Students pursuing the interdisciplinary option may use this course as one of their interdisciplinary science electives.
- Additional requirements for certification are:

PROFESSIONAL DEVELOPMENT COURSEWORK REQUIREMENTS: A minimum grade of C is required in all courses.		21
Liberal Arts & Sciences	LA&S 290 UKan 1	1
	LA&S 291 UKan 2	1
Curriculum & Teaching	C&T 360 Knowing and Learning in Science & Mathematics	3
	C&T 366 Classroom Interactions in Science & Mathematics	3
	C&T 448 Reading and Writing across the Curriculum	3
	C&T 460 Project-Based Instruction	3
	C&T 501 Student Teaching (6 hours) <i>Requires a 2.5 cumulative GPA in major and overall.</i>	6
	C&T 598 Special Topics Seminar	1

Suggested Schedule B.S. Physics, Pre-Professional Option

Fall Semester

Spring Semester

Freshman Year			
MATH 121, <i>Calculus I</i>	5	MATH 122, <i>Calculus II</i>	5
ENGL 101, <i>Composition</i>	3	ENGL 102, <i>Critical Reading & Writing</i>	3
CHEM 184, <i>Found. Chemistry I</i>	5	PHSX 211/213, <i>General Physics I</i> (majors are encouraged to take 213)	4
Humanities Elective	3	Social Science Elective	3
PHSX 150 <i>Seminar in Physics, Astronomy & Engineering Physics</i>	0.5		
	16.5		15

Sophomore Year			
PHSX 212 or 214, <i>General Physics II</i>	4	MATH 320, <i>Differential Equations</i>	3
ENGL elective	3	PHSX 501/503 <i>Undergrad Research</i>	1
MATH 290, <i>Elem. Linear Algebra</i>	2	PHSX 313, <i>General Physics III</i>	3
MATH 223, <i>Vector Calculus</i>	3	PHSX 316, <i>Intermediate Physics Lab</i>	1
EECS 138, <i>Intro to Computing</i> or EECS 168, <i>Programming I</i>	3-4	Humanities or Social Science Elective	6
	15-16		14

Junior Year			
PHSX 521, <i>Mechanics I</i>	3	PHSX 511, <i>Intro. Quantum Mechanics</i>	3
Math elective	3	PHSX 621, <i>Mechanics II</i>	3
PHSX 516, <i>Physical Measurements</i>	4	PHSX 536, <i>Elec. Circ. Meas. & Design</i>	4
Western Civ. I	3	Humanities or Social Science Elective	3
Free Electives	3	Western Civ. II	3
	16		16

Senior Year			
PHSX 711, <i>Quantum Mechanics</i>	3	PHSX 631, <i>Electromagnetic Theory II</i>	3
PHSX 531, <i>Electricity & Magnetism</i>	3	PHSX elective	3
PHSX 671, <i>Thermal Physics</i>	3	Free electives	10-11
Free electives	6		
	15		16-17

Suggested Schedule B.S. Physics, Interdisciplinary Science Option

Fall Semester

Spring Semester

Freshman Year			
MATH 121, <i>Calculus I</i>	5	MATH 122, <i>Calculus II</i>	5
ENGL 101, <i>Composition</i>	3	ENGL 102, <i>Critical Reading & Writing</i>	3
CHEM 184, <i>Found. Chemistry I</i>	5	PHSX 211/213, <i>General Physics I</i> (majors are encouraged to take 213)	4
Humanities Elective	3	Social Science Elective	3
PHSX 150 <i>Seminar in Physics, Astronomy & Engineering Physics</i>	0.5		
	16.5		15

Sophomore Year			
PHSX 212 or 214, <i>General Physics II</i>	4	MATH 320, <i>Differential Equations</i>	3
Third English Course	3	General Science background (further chemistry, intro. biology or geology)	3-5
MATH 290, <i>Elem. Linear Algebra</i>	2	PHSX 313, <i>General Physics III</i>	3
MATH 223, <i>Vector Calculus</i>	3	PHSX 316, <i>Intermediate Physics Lab</i>	1
EECS 138, <i>Intro to Computing</i> or EECS 168, <i>Programming I</i>	3-4	Humanities or Social Science Elective	3
		PHSX 501/503 <i>Undergrad Research</i>	1
	15-16		14-16

Junior Year			
PHSX 521, <i>Mechanics I</i>	3	PHSX 511, <i>Intro. Quantum Mechanics</i>	3
Math elective	3	Free Electives	6
Humanities or Social Science Elective	3	Physics lab or lecture (536, 621)	3-4
Western Civ. I	3	Western Civ. II	3
Free Electives	3		
	15		15-16

Senior Year			
Physics lab or lecture course (516,711)	3-4	Interdisciplinary science elective	3-4
PHSX 531, <i>Electricity & Magnetism</i>	3	PHSX elective	3
PHSX 671, <i>Thermal Physics</i>	3	Physics course – lab or lecture (631,621,536)	3-4
Interdisciplinary science elective	3-4	Free Electives	6
Free Electives	3		
	15-17		15-17

Suggested Schedule B.S. Physics (Pre-Professional Option) UKanTeach

Fall Semester

Spring Semester

Freshman Year			
MATH 121, <i>Calculus I</i>	5	MATH 122, <i>Calculus II</i>	5
ENGL 101, <i>Composition</i>	3	ENGL 102, <i>Critical Reading & Writing</i>	3
CHEM 184, <i>Found. Chemistry I</i>	5	PHSX 211/213, <i>General Physics I</i> (majors are encouraged to take 213)	4
Humanities Elective	3	Social Science Elective	3
LA&S 290 UKan 1	1	LA&S 291 UKan2	1
PHSX 150 <i>Seminar in Physics, Astronomy & Engineering Physics</i>	0.5		
	17.5		15

Sophomore Year			
PHSX 212 or 214, <i>General Physics II</i>	4	MATH 320, <i>Differential Equations</i>	3
C&T 360 <i>Knowing & Learning</i>	3	English elective	3
MATH 290, <i>Elem. Linear Algebra</i>	2	PHSX 313, <i>General Physics III</i>	3
MATH 223, <i>Vector Calculus</i>	3	PHSX 316, <i>Intermediate Physics Lab</i>	1
EECS 138, <i>Intro to Computing</i> or EECS 168, <i>Programming I</i>	3-4	C&T 366 <i>Classroom Interactions</i>	3
		PHSX 503, <i>Undergraduate Research</i>	1
	15-16		14

Junior Year			
PHSX 521, <i>Mechanics I</i>	3	PHSX 511, <i>Intro. Quantum Mechanics</i>	3
PHSX 516, <i>Physical Measurements</i>	4	PHSX 621, <i>Mechanics II</i>	3
C&T 448 <i>Reading & Writing</i>	3	PHSX 536, <i>Elec. Circ. Meas. & Design</i>	4
Western Civ. I	3	Social Science Elective	3
Math elective	3	Western Civ. II	3
History 136, <i>Perspectives</i>	3		
	18		16

Senior Year			
PHSX 711, <i>Quantum Mechanics</i>	3	PHSX 631, <i>Electromagnetic Theory II</i>	3
PHSX 531, <i>Electricity & Magnetism</i>	3	PHSX elective	3
PHSX 671, <i>Thermal Physics</i>	3	C&T 501, <i>Student teaching</i>	6
CHEM 598, <i>Research Methods</i>	3	C&T 598, <i>Special Topics Seminar</i>	1
C&T 460, <i>Project-Based Instruction</i>	3		
	16		13