

## Exhibit 12

### TRANSFER ADVISING GUIDE

**Brookdale Community College (Brookdale) to University of the Sciences in Philadelphia  
A.S. Science Option, Mathematics/Science → B.S. Physics (Tracks: Biophysics, Medical Physics, Pre-Med)**

**Brookdale Associate in Science  
Science Option**

**USciences Bachelor of Science  
Physics (Biophysics, Medical Physics, Pre-Med)**

Brookdale Courses	Cr.	USciences Courses	Cr.
ENGL121 English Composition: The Writing Process	3	WR101 Writing & Rhetoric I	3
ENGL122 English Composition: Writing and Research	3	WR102 Writing & Rhetoric II	3
MATH153 Pre-calculus Mathematics	4	MA107 Pre-calculus	3
MATH171 Calculus I	4	MA122 Calculus I	4
MATH172 Calculus II	4	MA221 Calculus II	4
BIOL101 General Biology I (serves as Career Studies)	4	BS132 Introductory Biology I BS134 Introductory Biology I Lab  [BS130 Introductory Biology I for students transferring prior to Fall 19]	3 1
CHEM101 General Chemistry I (serves as Career Studies) <i>(online course NOT accepted for transfer)</i>	5	CH111 Principles of Chemistry I CH113 Principles of Chemistry Lab I	3 1
CHEM102 General Chemistry II (serves as Career Studies) <i>(online course NOT accepted for transfer)</i>	5	CH112 Principles of Chemistry II CH114 Principles of Chemistry Lab II	3 1
CHEM203 Organic Chemistry I (serves as Career Studies)	5	CH211 Principles of Organic Chemistry I CH213 Principles of Organic Chemistry Lab I	3 1
CHEM204 Organic Chemistry II (serves as Career Studies)	5	CH212 Principles of Organic Chemistry II CH214 Principles of Organic Chemistry Lab II	3 1
PHYS121 General Physics I (serves as Science with lab)	4	PY211 Physics I	4
PHYS122 General Physics II (serves as Career Studies)	4	PY212 Physics II	4
COMP129 Information Technology	3	CS250 Information Technology <i>(serves as Elective)</i>	3
Social Sciences Elective <b>Choose One</b>	3	<i>(serves as GenEd Social Sciences Requirement)</i>	3
Humanities Elective <b>Choose One</b>	3-4	<i>(serves as GenEd MD Requirement)</i>	3
Humanities or Social Science Elective <b>Choose One</b>	3-4	<i>(serves as GenEd MD Requirement)</i>	3
<b>Brookdale credits toward AS</b>	<b>62-64</b>	<b>Credits Accepted</b>	<b>57</b>
<b>Additional Courses Necessary to Enter USciences with Junior (U3) Status:</b>			
BIOL102 General Biology II	4	BS133 Introductory Biology II BS135 Introductory Biology II Lab	3 1

		[BS131 Introductory Biology II for students transferring prior to Fall 19]	
PHYS223 General Physics III	4	PY301 Modern Physics I	3
<b>Total Brookdale Credits</b>	<b>70-72</b>	<b>Total Credits Accepted</b>	<b>64</b>

A minimum 2.7 cumulative GPA is required for admission.

A minimum grade of “B” in all science and mathematics courses (Prefixes: CHEM, MATH, PHYS, BIOL). Students who do not meet these minimum grade requirements can still transfer under the terms of this articulation agreement, subject to departmental review and approval.

The courses encompassed in the A.S. degree from Brookdale must be completed within the three years preceding matriculation at USciences. Students who take more than 3 years to complete the A.S. degree can still transfer under this articulation agreement, subject to departmental review and approval.

PE101/102-Physical Education I/II (1 cr) and PY100 – Physics Orientation (1 cr) will be waived for students transferring to USciences after earning the A.S. in Science Option, Mathematics/Science. However, the total credits required for graduation (includes transfer credits) will remain unchanged.

Graduation from USciences with a BS degree requires completion of specified courses and a total of 120-136 credit hours, depending upon the degree program. In order to enter USciences with U3 (junior) status and to facilitate the completion of a BS degree in two years of study at USciences, all students are strongly advised to complete more than 60 total credits of course work which is eligible for transfer to USciences. Students interested in transferring to USciences are strongly urged to contact the USciences Admission Office early in their enrollment at Brookdale for advising.

In addition to the coursework provided in the above table, the following types of courses will be needed to complete the *General Education Discipline Requirements* in USciences' General Education Curriculum:

- 3 credits in Social Sciences
- 6 credits in Humanities

Some or all of these 9 credits of coursework can be taken at Brookdale or after transferring to USciences (currently included in the 3<sup>rd</sup> and 4<sup>th</sup> year at USciences). If the 9 credits are taken at Brookdale, they should be selected from the following lists:

<p><b>3 credits in Social Sciences: Select ONE</b></p> <p>ANTH105, 115, 116            ECON105, 106, 107            HGEO105            POLI101, 105, 115            PSYC105, 106, 206, 207, 208, 226            SOCI101, 202, 215</p>	<p><b>GenEd Discipline Requirements – Social Sciences</b></p> <p>AN103, X01, X01            EC101, EC201, ECX01            SXX01            POX01            PS101, X01, 200, X01, 200, 201            SO101, 205, X01</p>
<p><b>6 credits in Humanities: Select TWO</b></p> <p>AMSL101, 102            ARAB101, 102            ARTH105, 106, 107            CHNS101, 102            CINE105            ENGL155, 156, 158, 231, 232, 235, 236, 245, 246, 275            FRCH101, 102, 203, 204, 206, 207            GRMN101, 102, 203, 204            HIST105, 106, 107, 108, 125, 135, 136, 137, 145, 146, 215, 217, 225, 227            HUMN125            ITAL101, 102, 203, 204            JPNS101, 102, 203, 204            MUSI115, 116            PHIL105, 115, 225, 226, 227            PHTY105            PORT101, 102            RUSS101, 102            SPAN101, 102, 203, 204, 207, 215            THTR105, 135</p>	<p><b>GenEd Discipline Requirements – Humanities</b></p> <p>HUX01, X01            AC101, 102            AR101, 340, 340            CI101, HUX01            HUX01            EN314, X01, 201, X01, 313, X01, X01, 334, 336, X01            FR101, 102, X01, X01, X01            GE101, 102, 201, 202            HIX01, X01, X01, X01, X01, X01, X01, 304, X01, X01, X01, X01, X01, X01            HUX01            HUX01, X01, X01, X01            HUX01, X01, X01, X01            MUX01, X01            PLX01, PL101, RS310, PLX01, ET303            HUX01            HUX01, X01            HUX01, X01            SP101, SP102, SP201, SP202, SP303, HUX01            HUX01, X01</p>

Suggested checklist for 3<sup>rd</sup> and 4<sup>th</sup> year at USciences for **BS in Physics (Biophysics track)** based on current approved curriculum:

*(this checklist is for planning purpose only and it is subject to changes; it does not constitute a contract)*

THIRD YEAR AT USCIENCES		
MA 222	Calculus III	4
ST 320	Introduction to Probability	3
PY 213	Physics III	4
PY 310	Mechanics	3
PY 370	Math Methods for the Phys Sci I	3
MA 316	Linear Algebra	3
MA 320	Differential Equations	3
PY 380	Electronics	3
PY 406	Advanced Lab	1
PY 410	Electricity and Magnetism	3
PY 420	Optics and Wave Phenomena	3
PY 450	Quantum Mechanics	3
PY 371	Math Methods for the Phys Sci II	3

FOURTH YEAR AT USCIENCES		
CS 201	Computer Programming I	3
PY 495	Undergraduate Research in Physics	2
CH 341	Molecular Structure Biochemistry	3
PY 431	Statistical Mechanics	3
PY 496	Advanced Research in Physics	3
CO 101	Intro to Communication	3
PY 340	Biophysics I	3
PY 305	Physics Seminar	1
	GenEd Humanities Requirement	6
	GenEd Social Sciences Requirement	3

Suggested checklist for 3<sup>rd</sup> and 4<sup>th</sup> year at USciences for **BS in Physics (Medical Physics track)** based on current approved curriculum:

*(this checklist is for planning purpose only and it is subject to changes; it does not constitute a contract)*

THIRD YEAR AT USCIENCES		
MA 222	Calculus III	4
ST 320	Introduction to Probability	3
PY 213	Physics III	4
PY 310	Mechanics	3
PY 380	Electronics	3
CO 101	Intro to Communication	3
MA 320	Differential Equations	3
CH 341	Molecular Structure Biochemistry	3
PY 406	Advanced Lab	1
PY 410	Electricity and Magnetism	3
PY 420	Optics and Wave Phenomena	3
PY 302	Modern Physics II	3

<b>FOURTH YEAR AT USCIENCES</b>		
PY 495	Undergraduate Research in Physics	2
PY 412	Physics of Radiation Therapy	3
PY 411	Advanced Electromagnetism	3
	GenEd Humanities Requirement	6
	GenEd Social Sciences Requirement	3
PY 496	Advanced Research in Physics	3
PY 340	Biophysics I	3
	Physics/Biology/Biochem elective	3
PY 305	Physics Seminar	1
	Free elective	2

Suggested checklist for 3<sup>rd</sup> and 4<sup>th</sup> year at USciences for **BS in Physics (Pre-Med track)** based on current approved curriculum:

*(this checklist is for planning purpose only and it is subject to changes; it does not constitute a contract)*

<b>THIRD YEAR AT USCIENCES</b>		
MA 222	Calculus III	4
	Statistics Elective	3
PY 213	Physics III	4
PY 310	Mechanics	3
PY 380	Electronics	3
MA 320	Differential Equations	3
CH 341	Molecular Structure Biochemistry	3
CO 101	Intro to Communication	3
PY 406	Advanced Lab	1
PY 410	Electricity and Magnetism	3
PY 420	Optics and Wave Phenomena	3
PY 302	Modern Physics II	3
BS 466	Genetics	4

<b>FOURTH YEAR AT USCIENCES</b>		
PY 495	Undergraduate Research in Physics	2
PY 412	Physics of Radiation Therapy	3
	GenEd Humanities Requirement	6
	GenEd Social Sciences Requirement	3
PY 496	Advanced Research in Physics	3
PY 340	Biophysics I	3
	Biology/Biochem elective	3
PY 305	Physics Seminar	1
	Free elective	2

## Progress in Completing USciences' General Education Curriculum

[For the most recent information, see the current USciences Catalog on its website]

*Discipline Requirements (minimum of 41 credits)*

<b>Discipline Requirement</b>	<b>Community College Courses // USciences Courses*</b>
Natural Science ( <b>ONE</b> semester of lab required) <b>7 credits</b>	BIOL101 BIOL102
Mathematics <b>6 credits</b>	MATH153 MATH171
Communication (written & oral) <b>9 credits</b>	ENGL121 & ENGL122 <b>CO101</b>
Social Sciences <b>6 credits</b>	<b>Choose One:</b> Social Sciences Elective  <b>Choose One USciences Course:</b> PO (Political Science), PS (Psychology), SO (Sociology), AN (Anthropology), SS (Social Sciences), EC (Economics), CO (excluding CO 101 and CO 204)
Humanities <b>6 credits</b>	<b>Choose Two USciences Courses:</b> AC (Arabic), AR (Art), CI (Chinese), CA (Classics), EN (excluding EN 101 and EN 102), FR (French), GE (German), LA (Latin), HI (History), HU (Humanities), MU (Music), PL (Philosophy), RS (Religious Studies), SP (Spanish), WC (World Cultures)
Multidisciplinary Inquiry <b>6 credits</b> (may be substituted by Social Sciences &/or Humanities courses)	<b>Choose One:</b> Humanities Elective  <b>Choose One:</b> Humanities or Social Science Elective
Physical Education <b>1 credit</b>	Waived

*Skills, Values, and Attitudes (one approved course for each)*

<b>Skills, Values, and Attitudes</b>	<b>Community College Course</b>	<b>USciences Course</b> [RED = courses taken after transferring to USciences]
Ethics		See list of USciences courses approved for Ethics
Information Literacy	BIOL102	
Oral Communication		<b>PY305</b>
Reasoning & Problem Solving	BIOL101	
Technology	BIOL101	
Written Communication		See list of USciences courses approved for Written Com

Skills requirement is usually fulfilled by taking courses that satisfy discipline requirements that are also approved for one or more GenEd skill.