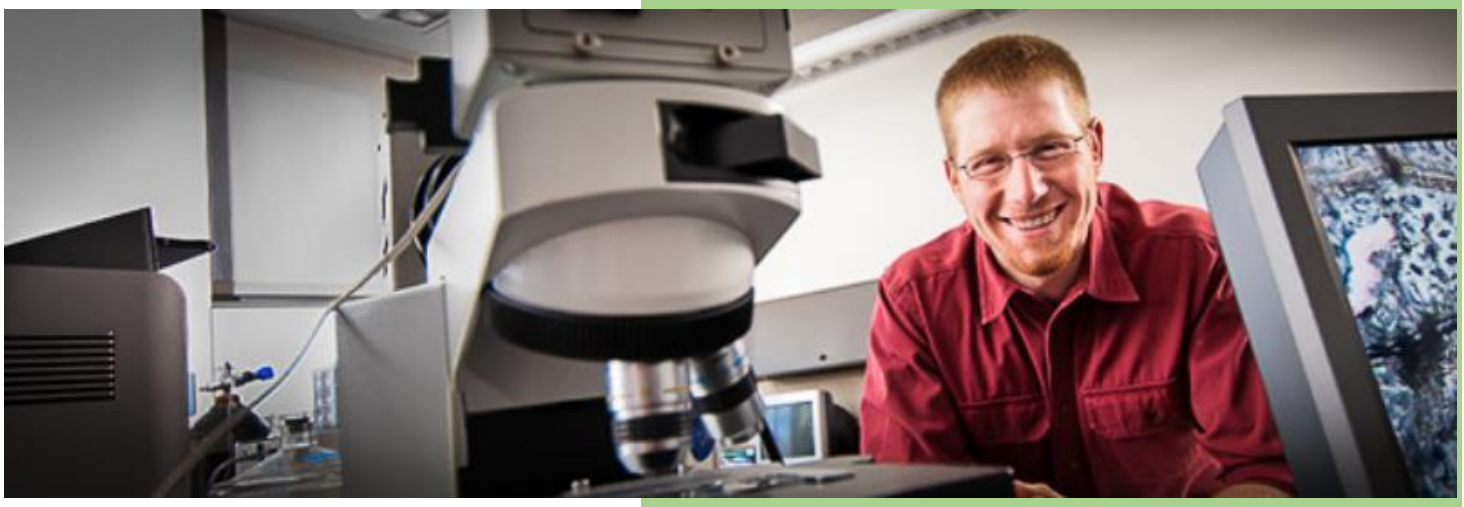
BioRenewable Systems (BRS) Advising Manual



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Introduction

This manual has been prepared to assist students majoring in BioRenewable Systems in optimizing and planning their academic careers at Penn State.

BioRenewable Systems (BRS) Major Overview

The BioRenewable Systems Major is an applied major that intertwines the study of engineering technology, natural resources, and agriculture with fundamentals of business, entrepreneurship, and sustainability. Solving 21st century problems and providing a foundation for our graduates to attain careers in both traditional sectors and those relating to the emerging bioeconomy are two of our goals. Students in this program will secure:

1) knowledge of fundamental sciences related to resources, processes, and products in biorenewable systems;
2) communication and managerial skills relevant to careers in product development, technology, sales, marketing and management; and
3) the ability to apply systems analysis skills, positioning them for effective problem solving and leadership in the agricultural and bioproducts industries.

BRS Options

The BRS program (BS) has two options: Agricultural Systems Management (ASM) and BioProducts (BP). Students must select an option.

BRS—Agricultural Systems Management (ASM) Option - (121 Credits Required)

This option applies a technological approach to understanding and managing agricultural production systems to meet economical and sustainable needs. Basic study is emphasized in the agricultural and business management sciences, along with the application of the technical results of engineering research, design, and manufacturing. Graduates of this option apply their technology and management training to the diverse areas of food and fiber production; bioprocessing; and land, water, and air resources.

BRS—BioProducts Option (BP) - (120 Credits Required)

The scientific nature of bio-based resources, their unique design, sustainability, and renewability constitute the core of this option. Building upon that foundation, students learn techniques for converting and efficiently utilizing these materials to maximize product life cycles, while simultaneously exploring relevant marketing and management strategies. Technical electives for this option emphasize material sciences, engineering, and/or business. Career tracks are broad, ranging from traditional forest products companies to emerging sectors, including bioenergy co-products.

If you have questions about the BioRenewable Systems program, please contact the people below, or you can visit: http://abe.psu.edu/majors for more information.

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Entrance to Major Requirements

Students are eligible to enter the BRS major once they:

- Earn more than 29.1 credits
- Earn a minimum cumulative GPA of 2.00 or higher

The Office of the University Registrar will notify students when they have gained 29.1 credits (3rd semester standing). This notification will include links to the full list of entrance requirements for all majors and a link to LionPATH's "Update Academics" page, where students can submit their request to enter a major.

Advisors

As a BioRenewable Systems student, you will be assigned an academic advisor when you: enroll as a freshman at University Park Campus; declare BioRenewable Systems as your major; or when you transfer to University Park from another campus location, college, or university. Your advisor will assist you in selecting courses to meet the academic requirements of the BioRenewable Systems major, while also meeting your personal goals.

Your advisor is a resource to answer academic questions during your career at Penn State. It is hoped that your advisor will become your friend and provide useful information concerning academic and non-academic matters as the need arises. You will normally retain the same academic advisor until you graduate, but changes are available upon request.

Graduation

To graduate, you must satisfy all University, College, and major requirements that were in effect at the time of your admission, or re-enrollment, as a degree candidate. The following tables detail BRS graduation requirements. Once completed, there is a process that must be followed to apply to graduate. Steps are as follows:

1. File your intent to graduate (policy 86-00) in LionPath.
    a. Use the "Apply for Graduation" link within the My Academics page in the LionPATH Student Center, you can set your intent to graduate.
        - View LionPATH Video Tutorial on How to Apply for Graduation (https://tutorials.lionpath.psu.edu/public/S_ApplyGrad/)
        - Download LionPATH Tutorial in Microsoft Word on How to Apply for Graduation (https://tutorials.lionpath.psu.edu/public/Docs/S_ApplyGraduation.docx)
2. After the activation period expires you must contact the appropriate college office or Graduate Enrollment Services to activate or remove your intent to graduate.

Unofficial programs are distributed at the commencement ceremony. If your intent to graduate is activated after the student information has been sent to the publisher, your name will not appear in the program. For fall and spring ceremonies the data is sent during the tenth week of the semester. For the summer ceremony the data is sent during the fifth week.

Tables of BRS Program Requirements

Agricultural Systems Management (ASM) Option

(121 Credits Required)

Suggested Academic Plan for Agricultural Systems Management Option

First Year			
Fall	**Credits**	**Spring**	**Credits**
BE 1 or First Year Seminar	1	CHEM 111†	1
CHEM 110†	3	ACCTG 211	4
EDSGN 100*	3	ENGL 15‡†, ENGL 30‡†, or ESL 15‡†	3
MATH 110‡† or 140‡†	4	PHYS 250† or 211†	4
General Education Course (GHW)	1.5	General Education Course	3
ECON 104† or EBF 200†	3	General Education Course (GHW)	1.5
	15.5		**16.5**
Second Year			
Fall	**Credits**	**Spring**	**Credits**
AGBM 101 or ECON 102†	3	BLAW 243, BA 243, or BA 241 and BA 242	3-4
BIOL 110† or (BIOL 11† and 12†)[a]	4	SOILS 101	3
CAS 100A‡† or 100B‡†	3	AGRO 28 or HORT 101	3
STAT 200‡† or 240‡†	3-4	General Education Course	3
General Education Course	3	General Education Course	3
	16-17		**15-16**
Third Year			
Fall	**Credits**	**Spring**	**Credits**
AGBM 106*	3	BRS 392‡†	2
BRS 221*	3	BRS 437*	4
BRS 300*	3	ANSC 100 /ANSC 201	3-4
ASM 310*	3	Selection	3
ASM 327*	3	Selection	3
BRS 391‡†	2		
	17		**15-16**
Fourth Year			
Fall	**Credits**	**Spring**	**Credits**
BRS 428	3	BRS 426	3
BRS 393[b]	1	BRS 429W	3
BRS 422	3	BRS 490[b]	1
Selection	3	Selection	3
Selection	3	Selection	3
	13		**13**

Total Credits 121-124

* Course requires a grade of C or better for the major
† Course satisfies General Education and degree requirement
‡† Course requires a grade of C or better for General Education
[a] BIOL 11 and 12 are not available at University Park
[b] BRS 393 and BRS 490 are repeatable courses. BRS 393 is offered a week before the Fall semester, and requires an additional fee.

Agricultural Systems Management (ASM) Option -- Selection List

The ASM option includes 15 "Selection" credits.

These 15 credits must be either 1) selected from courses on this approved list, or, 2) approved by petition following consultation with an advisor. The first column of the table notes suggested specialization areas. Students do not need to choose a specialization area, nor do they need to take all of the classes within a given specialization area. Although we encourage students to use these 15 selection credits to specialize in a given niche, or better yet to acquire a minor, it is up to the student how these credits are used. Some students prefer to mix and match courses from various areas, and that is ok. Common minors for ASM students include: Agribusiness Management, Agronomy, Engineering Entrepreneurship, Animal Science, Horticulture, Forest Science, Sustainability Leadership, Off Road Equipment, and Environmental Resource Management.

Specialization Area	Possible Courses	Abbreviated Title	Prerequisites
Agronomy	AGRO 423	Forage Crop Mgmt	AGRO 028
	AGRO 425	Field Crop Mgmt	AGRO 028
	AGRO 438	Principles of Weed Mgmt	6 cr. in plant sciences
Agribusiness Management	AG BM 302	Food Prod Mktg	AG BM 101, AG BM 102, AG BM 106
	AG BM 308W	Strategic Decision Making in Agribusiness	AG BM 101, AG BM 102, AG BM 106
	AG BM 320	Markets and Prices	SCM 200 or STAT 200
	AG BM 338 (IL)	AG BM in the Global Economy	AG BM 101, AG BM 102, AG BM 106
	AG BM 407	Farm Plan and Fin Mgmt	AG BM 101, AG BM 106
	AG BM 408	Fin Decision Making for Agribusiness	AG BM 308W, B A 301
	AG BM 440	Food Product Innovation Management	AG BM 302
	AG BM 460	Managing the Food System	AG BM 320, AG BM 338
Agricultural Mechanization	A S M 320	Combustion Engines	A S M 310
	A S M 420	Principles of Off-Road Ma chines	Concurrent: A S M 320
	A S M 424	Sel Mgmt Ag Mach	Concurrent: A S M 320
Animal Sciences	AN SC 300	Intgratd Anml Biol	BIOL 011 and BIOL 012 or BIOL 110
	AN SC 301	Animal Nutrition	3 cr. in biochemistry or organic chemistry
	AN SC 305	Comp Anim Ntr Mgmt	AN SC 201
	AN SC 306	Swine Prod & Mgmt	AN SC 201
	AN SC 308	Sheep/Goat-Prd Mgt	AN SC 201
	AN SC 309	Beef Prod & Mgmt	AN SC 201
	AN SC 310	Dairy Mgmt	AN SC 201
	AN SC 311	Poul Prod & Mgmt	AN SC 201
	AN SC 327	Horse Prod & Mgmt	AN SC 201
	AN SC 410	Adv Dairy Herd Mgt	AN SC 310, concurrent: AN SC 400
	AN SC 420	An Ntr/Feed Tech	AN SC 301
	AN SC 450	Dairy Mgmt Systems	AN SC 310, AN SC 400, AN SC 410
Agricultural Sciences	AGECO 201	Intro Agroecology	
	AGECO 457	Principles of IPM	ENT 313, HORT 238
	BRS 411	Biobased Fiber Science	CHEM 110, BRS 300
	BRS 423	Deter Prot Bioproducts	BRS 300, concurrent: BRS 411
	ENT 202	Insect Connection	
	ENT 313	Intro Ent	3 cr. of natural science
	ENT 316	Field Crops Ent	ENT 313
	ENT 402W	Biol Anim Parasit	BIOL 110
	ENT 410	Insect Struct/Fnctn	BIOL 110, BIOL 220W, BIOL 230W, BIOL 240W
	E R M 300	Basic Princ Calc Env Analysis	3 cr. in BIOL, CHEM 111, MATH 110 or
	E R M 412	Resource System Analysis	BIOL 220W, E R M 300, STAT 240, MATH
	E R M 413W	Case Studies is Ecosys Mgmt	BIOL 220W, SOILS 101, concurrent: E R
	FD SC 200	Intro to Food Science	CHEM 110

	FD SC 207	Animal Products	
	FD SC 208	Animal Products Tech Lab	Concurrent: FD SC 207
	FOR 203	Field Dendrology	Concurrent: FOR 200W or W P 200W
	FOR 308	Forest Ecology	Concurrent: FOR 203
	FOR 320	Forest Fire Mgmt	FOR 308
	FOR 366	Forest Resources Measurements	STAT 240
	FOR 410	Forest Ecosys Mgmt	3 cr. in both biology and ecology
	FOR 418 (US;IL)	Agroforestry	
	FOR 421	Silviculture	FOR 308, FOR 366
	FOR 455	Rem Sens & Spa Dat	MATH 110, 3 cr. in computer science, 6
	FOR 475	Forest Soils Mgmt	FOR 308, 3 cr. in soils
	HORT 202	Plant Propagation	BIOL 027 or BIOL 100 or HORT 101
	HORT 238	Turf Orn Weed Ctrl	CHEM 110
	HORT 315	Envir Effect Hort	HORT 101, HORT 202
	HORT 412W	Post-Har Physiol	6 cr. in horticulture or other plant
	HORT 433	Veg Crops	HORT 101, HORT 315
	SOILS 401	Soil Comp/Phy Prop	SOILS 101
	SOILS 402	Chem Soils Fertlzr	CHEM 112, SOILS 101
	SOILS 412W	Soil Ecol	BIOL 011, BIOL 127, or BIOL 110
	SOILS 418	Nutr Mgmt & Ag Sys	
	SOILS 450	Environmental GIS	SOILS 101
	TURF 235	Turfgrass	
	TURF 238	Turf Orn Weed Ctrl	CHEM 110
	TURF 434	Turf Edaphology	SOILS 101, TURF 235
	TURF 435	Turf Nutr	SOILS 101, TURF 235
	W F S 209	Wildl Fish Conserv	BIOL 110 or BIOL 240W
	W F S 446	WildL Fish Pop Dyn	W F S 209
Biology	BIOL 220W	Biology Pop Comm	BIOL 110
	BIOL 240W	Biol Func Dev Org	BIOL 110, CHEM 110
	BIOL 436	Pop Ecol Glob Clim	BIOL 220W
Business	ACCTG 311	Acctg Sys & Cntrl	ACCTG 211
	ACCTG 404	Managerial Accctg	ACCTG 211, SCM 200 or STAT 200, ECON 102
	ACCTG 471	Int. Fin Acctg I	ACCTG 211 or ACCTG 311
	B A 250	Small Business Mgmt.	3 cr. in economics
	B LAW 425	Environmental Law	B LAW 341 or B LAW 243
	B LAW 445	Intell Prop & Comp	B LAW 441
	ECON 302 (GS)	Inmd Microec Anly	ECON 102
	ECON 304 (GS)	Inmd Macroec Anly	ECON 104
	ECON 342 (GS)	Industrial Orgn	ECON 102
	E R M 402	Found. of Sustain. Business	AG BM 101 or ECON 102 or ECON 104
	ENGR 310**	Entrepreneurial Leadership	(**AEE 360, MGMT 215, or SUST 200 may be acceptable alternatives by petition. Consult with your advisor.)
	ENGR 407	Tech-based Entrepreneurship	ECON 102 or ECON 104
	ECON 315, or	Labor Economics	ECON 102
	LER 100 (GS)	Employment Relations	
	IB 303, or	Int'l. Business Operations	5th semester standing
	ECON 333	International Economics	ECON 102, ECON 104 or ECON 014
	FIN 100	Introduction to Finance	3rd semester standing
	I E 302	Engineering Economy	MATH 141
	LER 201 (GS)	Employment Law	
	LER 444	Occupat Health	LER 100
	LER 464	Com Skls Ldrs I Go	
	LER 465	Coll Dec Making	
	MGMT 100	Survey of Mgmt	
	MGMT 326	Org Beh & Design	B A 304 or MGMT 301
	MGMT 471W	Strategic Management	MGMT 301, MKTG 301, FIN 301, SCM 301

	MKTG 221	Contemp Am Mktg	3 cr. in economics
	MKTG 302	E-Commerce Mktging	B A 303 or MKTG 301
	PSYCH 100 (GS)	Introductory Psychology	
	PSYCH 281 (GS)	Indust-Org Psych	PSYCH 100
	SCM 301	Supply Chain Management	ACCTG 211, ECON 102, SCM 200 or STAT 200
Engr. Tech. Fund.	E MCH 211	Statics	Concurrent: MATH 141
	E MCH 212	Dynamics	E MCH 211, MATH 141
	E MCH 213	Strength of Materials	E MCH 211
	PHYS 212	Physics: Elec and Mag	PHYS 211, concurrent: MATH 141
Math	MATH 111 (2) or	Calculus II w/Analytic Geometry, or	MATH 110
	MATH 141 (4)	Techniques of Calculus II	MATH 140
	MATH 200 or higher		
	STAT 300 or higher		

BRS Agricultural Systems Management Option checklist

Student Name: **PSU ID:** **Campus ID:**

	Cr	Sem	Grade	Alternative
Communications				
ENGL 15	3		**A B C**	
CAS 100A/B	3		**A B C**	
BRS 391	2		**A B C**	
BRS 392	2		**A B C**	
Quantification				
MATH 110	4		**A B C**	**MATH 140**
STAT 200	4-3		**A B C**	**STAT 240**
Natural Science				
BIOL 110	4			BIOL 11 & 12
CHEM 110	3			
CHEM 111	1			
PHYS 250	4			PHYS 211
Art (3)				
Single domain	3			
Humanities (3)				
Single domain	3			
Social Science				
AGBM 101	3			ECON 102
ECON 104	3			EBF 200
Health & Wellness (3)				
Single domain				
Single domain				
Single domain				
Integrative Studies (6)				**Domains**
☐	3			
☐	3			

	Cr	Sem	Grade	Alternative
Prescribed courses				
1st Year Seminar	1			
Business				
ACCTG 211	4			
BLAW 243	3-4			BA 241 & BA 242
AGBM 106	3		**A B C**	
BRS 437	4		**A B C**	
Ag Sciences				
AGRO 028	3			HORT 101
ANSC 201	4			
SOILS 101	3			
Engineering Technology				
EDSGN 100	**3**		**A B C**	
BRS 221	**3**		**A B C**	
BRS 300	**3**		**A B C**	
ASM 310	**3**		**A B C**	
ASM 327	**3**		**A B C**	
BRS 393	1			
BRS 422	3			
BRS 426	3			
BRS 428	3			
BRS 429W	3			
BRS 490	1			
Specialization Area Selections				
	3			
	3			
	3			
	3			
	3			
	3			

☐ World Language Admission Requirement

☐ United States Culture Course

☐ International Competence Course

Tables of BRS Program Requirements

BioProducts (BP) Option

(120 Credits Required)

Suggested Academic Plan for BioProducts Option, University Park Campus

First Year			
Fall	**Credits**	**Spring**	**Credits**
BE 1 or First Year Seminar	1	CHEM 111†	1
CHEM 110†	3	ACCTG 211	4
EDSGN 100*	3	ENGL 15‡†, ENGL 30‡†, or ESL 15‡†	3
MATH 110‡† or 140‡†	4	PHYS 250† or 211†	4
General Education Course (GHW)	1.5	General Education Course	3
ECON 104† or EBF 200†	3	General Education Course (GHW)	1.5
	15.5		**16.5**
Second Year			
Fall	**Credits**	**Spring**	**Credits**
AGBM 101 or ECON 102†	3	BLAW 243, BA 243, or BA 241 and BA 242	3-4
BIOL 110† or (BIOL 11† and 12†)[a]	4	Selection	3
CAS 100A‡† or 100B‡†	3	Selection	3
STAT 200‡† or 240‡†	3-4	General Education Course	3
General Education Course	3	General Education Course	3
	16-17		**15-16**
Third Year			
Fall	**Credits**	**Spring**	**Credits**
AGBM 106*	3	BRS 392‡†	2
BRS 221*	3	BRS 437*	4
BRS 300*	3	BRS 417	4
Selection – BRS Leadership/Entrepreneurship**	3	BRS 411	4
Selection	3		
BRS 391‡†	2		
	17		**14**
Fourth Year			
Fall	**Credits**	**Spring**	**Credits**
BRS 402*	3	BRS 426	3
BRS 393[b]	1	BRS 429W	3
BRS 428	3	BRS 490[b]	1
BRS 422	3	BRS 423	3
Selection	3	Selection	3
	13		**13**

Total Credits 120-122

* Course requires a grade of C or better for the major
** ENGR 310, AEE 360, MGMT 215, or SUST 200 are acceptable. Consult with your advisor
† Course satisfies General Education and degree requirement
‡† Course requires a grade of C or better for General Education
[a] BIOL 11 and 12 are not available at University Park
[b] BRS 393 and BRS 490 are repeatable courses. BRS 393 is offered a week before the Fall semester and cost incurred

Bioproducts (BP) Option -- Selection List

The BP option includes 15 "Selection" credits.

These 15 credits must be either 1) selected from courses on this approved list, or, 2) approved by petition following consultation with an advisor. The first column of the table notes suggested specialization areas. Students do not need to choose a specialization area, nor do they need to take all of the classes within a given specialization area. Although we encourage students to use these 15 selection credits to specialize in a given niche, or better yet to acquire a minor, it is up to the student how these credits are used. Some students prefer to mix and match courses from various areas, and that is ok. Common minors for BP students include Biology, Business Logistics, Chemistry, Economics, Energy Business and Finance, Engineering Entrepreneurship, Engineering Leadership Development, Environmental and Renewable Resource Economics, Forest Science, Labor Studies and Employment Relations, Leadership Development, Physics, Polymer Science, Statistics, or Sustainability Leadership.

Specialization Area	Possible Courses	Abbreviated Title	Prerequisites
Business	ACCTG 311	Acctg Sys & Cntrl	ACCTG 211
	ACCTG 404	Managerial Accctg	ACCTG 211, SCM 200 or STAT 200, ECON 102
	ACCTG 471	Int Fin Acctg I	ACCTG 211 or ACCTG 311
	B A 250	Small Business Management	3 cr. in economics
	B LAW 425	Environmental Law	B LAW 341 or B LAW 243
	B LAW 445	Intell Prop & Comp	B LAW 441
	ECON 302(GS)	Inmd Microec Anly	ECON 102
	ECON 304(GS)	Inmd Macroec Anly	ECON 104
	ECON 342(GS)	Industrial Orgn	ECON 102
	ECON 315 or LER 100(GS)	Labor Economics, or Employment Relations	ECON 102
	IB 303, or ECON 333	International Business Operations or International Economics	5th semester standing ECON 102, ECON 104 or ECON 014
	FIN 100	Introduction to Finance	3rd semester standing
	I E 302	Engineering Economy	MATH 141
	LER 201(GS)	Employment Law	
	LER 444	Occupat Health	LER 100
	LER 464	Com Skls Ldrs I Go	
	LER 465	Coll Dec Making	
	MGMT 100	Survey of Mgmt	
	MGMT 326	Org Beh & Design	B A 304 or MGMT 301
	MGMT 471W	Strategic Management	MGMT 301, MKTG 301, FIN 301, SCM 301
	MKTG 221	Contemp Am Mktg	3 cr. in economics
	MKTG 302	E-Commerce Mktging	B A 303 or MKTG 301
	PSYCH 100(GS)	Introductory Psychology	
	PSYCH 281(GS)	Indust-Org Psych	PSYCH 100
	SCM 301	Supply Chain Management	ACCTG 211, ECON 102, SCM 200 or STAT 200
Chemistry	BMB 211	Elementary Biochemistry	CHEM 110; CHEM 202 or CHEM 210
	BMB 200 and higher		
	CHEM 112	Chemical Principles II	CHEM 110
	CHEM 113 (1)	Continuation of CHEM 111	CHEM 110, concurrent: CHEM 112
	CHEM 202, or CHEM 210	Fundamentals of Organic Chemistry I, or Organic Chemistry I	CHEM 101 OR CHEM 110 OR CHEM 106 CHEM 112
	CHEM 203, or CHEM 212	Fundamentals of Organic Chemistry II, or Organic Chemistry II	CHEM 202 CHEM 210
	CHEM 227	Analytical Chemistry	CHEM 113 and MATH 140
Biology and Plants	AGECO 201	Introductory Agroecology	
	AGRO 028	Principles of Crop Management	
	BIOL 127, or BIOL 240W (4)	Introduction to Plant Biology, or Biology: Funct. & Devel. of Organisms	 BIOL 110, CHEM 110

	BIOL 230W (4)	Biology: Molecules and Cells	BIOL 110, CHEM 110
	BMB 251/ MICRB 251	Molecular and Cell Biology	CHEM 112
	BIOL 407	Plant Developmental Anatomy	BIOL 240W
	BIOL 424	Seeds of Change: The Uses of Plants	BIOL 110; BIOL 220W, BIOL 230W or BIOL 240W
	BIOL 441	Plant Physiology	BIOL 230W, BIOL 240W
	BIOL 459	Plant Tissue Culture and Biotechnology	BIOL 230W; or BMB 251, BMB 252
	HORT 101	Horticultural Science	
	FOR 203	Field Dendrology	Concurrent: FOR 200W or W P 200W and W P 203
	FOR 308	Forest Ecology	Concurrent: FOR 203
	FOR 366	Forest Resources Measurements	STAT 240
	FOR 410	Forest Ecosys Mgmt	3 cr. in both biology and ecology
	FOR 418 (US;IL)	Agroforestry	
	FOR 421	Silviculture	FOR 308, FOR 366
	PPATH 405	Microbe-Plant Interactions	BIOL 110
	PLANT 461	Emerging Issues in Plant Sciences	AGRO 028 or HORT 101; AGECO201 or BIOL 127 or HORT 202; ENT 313 and SOILS 101
Materials Science/ Polymers	MATSE 101	Energy and the Environment	
	MATSE 112	Applied Materials Chemistry for Engineers	CHEM 110
	MATSE 201	Introduction to Materials Science	CHEM 112; MATH 231
	MATSE 202	Introduction to Polymer Materials	CHEM 202, MATH 231
	MATSE 441	Polymeric Materials I	CHEM 210, MATH 231
	MATSE 443	Introduction to the Materials Science of Polymers	CHEM 210, MATH 231
	MATSE 447	Rheology and Processing of Polymers	MATSE 443
	MATSE 448	Polymer Processing Technology	MATSE 447 or CHE 302A
	MATSE 473	Polymeric Materials Laboratory—Synthesis (1)	MATSE 443
	MATSE 474	Polymeric Materials Laboratory—Characterization (1)	MATSE 443
	E MCH 315	Mechanical Reponses of Materials	E MCH 213 or E MCH 210
	E MCH 471	Engineering Composite Materials	E MCH 213 or E MCH 210; E MCH 315, E SC 414M, or MATSE 201
	E SC 484	Biologically Inspired Nanomaterials	PHYS 214, MATH 230
Engineering Technology Fundamentals	E MCH 211	Statics	Concurrent: MATH 141
	E MCH 212	Dynamics	E MCH 211, MATH 141
	E MCH 213	Strength of Materials	E MCH 211
	PHYS 212	Physics: Elec and Mag	PHYS 211, concurrent: MATH 141
	MATH 034	The Mathematics of Money	
Math	MATH 111 (2) or MATH 141 (4)	Calculus II with Analytic Geometry, or Techniques of Calculus II	MATH 110 MATH 140
	MATH 200 or higher		
	STAT 300 or higher		

BRS BioProducts Option checklist

Student Name: **PSU ID:** **Campus ID**

	Cr	Sem	Grade	Alternative
Communications				
ENGL 15	3		**A B C**	
CAS 100A/B	3		**A B C**	
BRS 391	2		**A B C**	
BRS 392	2		**A B C**	
Quantification				
MATH 110	4		**A B C**	**MATH 140**
STAT 200	4-3		**A B C**	**STAT 240**
Natural Science				
BIOL 110	4			BIOL 11 & 12
CHEM 110	3			
CHEM 111	1			
PHYS 250	4			PHYS 211
Art (3)				
Single domain	3			
Humanities (3)				
Single domain	3			
Social Science (6)				
AGBM 101	3			ECON 102
ECON 104	3			EBF 200
Health & Wellness (3)				
Single domain				
Single domain				
Single domain				
Integrative Studies (6)				**Domains**
☐	3			
☐	3			

	Cr	Sem	Grade	Alternative
Prescribed courses				
1st Year Seminar	1			
Business				
ACCTG 211	4			
BLAW 243	3-4			BA 241 & BA 242
AGBM 106	3		**A B C**	
BRS 437	4		**A B C**	
Option Courses				
BRS 411	4			
BRS 423	3			
BRS 417	4			
ENGR 310**	3		**A B C**	
BRS 402	3		**A B C**	
Engineering Technology				
EDSGN 100	**3**		**A B C**	
BRS 221	**3**		**A B C**	
BRS 300	**3**		**A B C**	
BRS 393	1			
BRS 422	3			
BRS 426	3			
BRS 428	3			
BRS 429W	3			
BRS 490	1			
Specialization Area Selections				
	3			
	3			
	3			
	3			
	3			
	3			

☐ World Language Admission Requirement

☐ United States Culture Course

☐ International Competence Course

Minors

Opportunities exist for BRS majors to develop areas of interest by obtaining a Minor. Early planning with an advisor may allow you to add depth and breadth to your college career and help you to attain additional personal and academic goals. (Note: A grade of C or better must be earned in courses applying to a minor). Minors should be chosen in eLion before the sixth semester begins. Several minors fit well into the BRS curriculum.

Selected Minors to Complement a BRS Major

	Minor
Technology	Off-Road Equipment
	Science, Technology, and Society
	Geographic Information Systems
Agricultural Sciences and Environment	Agronomy
	Watersheds and Water Resources
	Mushroom Science and Technology
	Animal Science
	Horticulture
	Energy, Environmental & Mineral Economics
	Environmental and Renewable Resource Economics
	Forest Science
	Environmental Resource Management
Business and Leadership	Agricultural Business Management
	Legal Environment of Business Biology
	Labor and Industrial Relations
	Business (offered by Liberal Arts)
	Dispute Management Resolution
	Economics
	Global Business Strategies for the Earth, Energy & Material Industries
	Engineering Entrepreneurship
	Information Systems and Statistical Analysis
	Operations Management
	Management Information Systems
	Industrial Health and Safety
	Insurance
	Real Estate
Science	Biochemistry and Molecular Biology
	Microbiology
	Biology

Opportunities for International Experiences

One of the characteristics of a world-class graduate in a technical field is knowledge and appreciation for the global economy. Probably the best way to gain global experiences is through participation in an international activity while you are still a student. Fortunately, there are numerous opportunities for gaining international experiences and perspectives through activities such as study abroad programs (for a semester or academic year), international co-ops and internships, alternative Spring Break tours, technical study tours, PSU course/international tour combinations, and May study tours.

Financial Support for International Activities

Some study abroad programs offer financial support to each student who is accepted into the program. There are scholarships available through the College of Agricultural Sciences specifically for students who are gaining international experiences. The deadline dates to apply for awards from College of Agricultural Sciences for programs are typically:

Summer semester	: March 15
Fall semester	: April 15
Spring semester	: September 30 of previous year
Spring break study tour	: December 15 of previous year

Students who apply after the above deadline dates might be considered for awards, depending on whether all the funds have been awarded or not. For additional information, exact deadline dates, application forms, or any questions regarding studying abroad, please contact the International Programs Office at 106 Agricultural Administration Building, 814-863-0249, or visit their website: http://agsci.psu.edu/international/undergraduates.

The Penn State Office of Global Programs also offers scholarships to study abroad and has an Education Abroad Fair every year. Visit http://gpglobalea.gp.psu.edu/ for more information.

Global Engineering Education

The mission of Global Engineering Education Programs is to provide opportunities for College of Engineering students, faculty, and staff to participate in international educational experiences and help them to become World Class Engineers. The website contains a searchable database of study abroad programs for engineering majors and others, checklists for how to prepare for international experiences, information about program deadlines and application procedures, and useful resources for going abroad. Please take a look at http://www.engr.psu.edu/international.

Clubs

Agricultural Systems Management Club

The Agricultural Systems Management Club exists for you, the student. It is organized so that you will have an opportunity to meet on an informal basis as individuals who have similar interests. Club meetings are every two weeks during the semester. Club activities have included speaker programs, picnics and banquets, fund raisers, and trips. Social activities have included a fall and spring picnic, hay-ride, and trap shoot. Fund raising activities have included: Christmas wreath sales, lawn mower clinics, yard clean-up, picnic table sales, and tractor overhaul. The Club normally supports college and university functions.

The ASM Club offers many opportunities to develop leadership skills by having officers and student-organized events. The club provides national and international leadership opportunities and involvement through its participation in the National Council of Student Mechanization Branches of the American Society of Agricultural and Biological Engineers. The club has supported student travel to the International Summer and Winter Meetings and has had several members hold office in the national organization.

The key to the club's success and to your satisfaction is your involvement in the planning and organizing of club activities. You are encouraged to become involved in the Agricultural Systems Management Club and make the club function be of benefit to you. While the Agricultural Systems Management Club is not the

largest group on campus, it is a strong group that works together to be heard. The potential of the Agricultural Systems Management Club is limited only by your level of involvement. Commit some time to get involved and make the club your organization, meeting your needs.

The ASM Club website can be found at: http://abe.psu.edu/students/clubs-and-organizations/agricultural-systems-management-club.

BioRenewable Systems Club

The BioRenewable Systems Club aims to create a platform to begin growth of this field with a community of resources and shared ideas by providing programs and opportunities related to the major. We make this possible by partnering with other organizations and hosting events throughout the school year. Together we can enhance the development of this program through innovated ideas and actions.

Penn State Pullers

The Penn State Pullers compete in a ¼ scale tractor pulling contest sponsored by ASABE (The American Society of Agricultural and Biological Engineers). Students design and build ¼ scale tractors to compete nationally with other universities. The four main judging categories are: written design report, team presentation, individual tractor design, and performance competition. The performance competition is a multi-stage tractor pull using a progressive weight sled.

The Penn State pullers website can be found at: http://pennstatepullers.weebly.com/.

Scholarships

Students are eligible for scholarships awarded through the College of Agricultural Sciences. The scholarship application for the academic year is usually available until April 30th of that year. Those who are selected to receive a College and/or Department scholarship will be notified via mail in July. Please visit http://agsci.psu.edu/ students/scholarships for more information.

Our Department of Agricultural and Biological Engineering awards over $80,000 in scholarships annually.