

# Individualized Major in the College

## College of Agriculture and Life Sciences

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## Charge

The Individualized Major Task Force will design a new individualized major in the College for the purpose of recruiting the best high school students in Texas to the College. Task Force 5 will generate a report that details the justification and need for the new degree, anticipated costs, and a description, proposed CIP code, entry requirements, learning outcomes, goals, purpose and administration of a new flexible major that will be built off the backbone of the University Entrepreneurship or Agribusiness Entrepreneurship minors. This report will include a list of requirements, electives and a sample four-year degree plan. ***This charge has now been answered through this report.***

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## **Task force process**

The task force met a total of 14 times in developing a response to this charge. We identified few other schools and even fewer peer institutions with such a major (Appendix 1). We developed numerous scenarios justifying the need for an individualized major (Appendix 2) and a plan for how it would be implemented. We determined that Department Heads and Associate Department Heads (who are also faculty) input was needed before proceeding further and presented and discussed the case with them over Zoom. We then met with Academic Advisors over Zoom. This report was developed based on the totality of these activities.

## **Task force summary recommendation**

Overall, the task force believes that an individualized major would be an exciting approach to expand opportunities and options for incoming students and capture a new pool of undergraduate talent. However, it would be resource intensive (on the order of \$25,000 per student) with high risk in the ability to achieve 20-25 students in the program, and it would also be an uphill battle to gain faculty buy-in, as there was little perceived need from departments or academic advisors. Unless donor dollars could be secured specifically for and only for an individualized major program for incoming freshmen, where such dollars would otherwise be lost, stakeholders believed there may be other impactful ways to strengthen programs to attract outstanding undergraduates. One volunteered alternative based on stakeholder feedback would be to rejuvenate the COALS honors program, and in doing so, provide support for high-impact activities and scholarship opportunities that would aid recruiting the most promising students to our college.

## Justification and need for an individualized major

The overall justification of the individualized major is that it would attract outstanding students that TAMU-COALS is not currently attracting. Doing so would increase the overall quality of TAMU-COALS undergraduate students, as well as to help to identify future areas of potential interest that are not currently offered in the college. Three other major potential benefits were identified by some participant stakeholders. First, identifying new areas for departments to make “mainstream” degree programs was seen as a positive by some. Second, many saw the individualized major as a positive attempt and opportunity to generate more flexibility in degree plans, which have become too “rigid” in many departments. Third, the entrepreneurship program was seen as a positive and there was some encouragement for developing and expanding this. Overall, however, there were far more concerns than excitement about an Individualized Major for entering freshmen program among the discussion participants.

An important underlying assumption given to the task force was that there has been a pool of outstanding potential freshmen that are being lost to other schools because our current majors are too restrictive.

From our research and discussions, we neither heard, nor found evidence, that:

- 1) Students are applying to TAMU-COALS but not coming because they could not find a major. Surveys of students declining their acceptance offer indicated the most common reason they did not come to TAMU was “funding / cost” according to Dr. Craig Coates. However, Dr. Coates believes that these students would improve our demographics if we could capture them in some way, and
- 2) The best students are not applying to TAMU because we do not have an appropriate major – this would be much more difficult objective data to obtain; in discussions with academic advisors, none said they were aware of such students. Substantial additional research with high school advisors and high school sophomores and juniors is required to identify this dimension in more depth -- multiple efforts to contact local high school counselors were unsuccessful.

These observations suggest we may not have good justification for developing an individualized major option at this time. However many stakeholders and committee members believe such a program would be of greater interest and need if it took transfer and change of major students.

**These observations suggest we may not have good justification for developing an individualized major option at this time.**

## Anticipated costs

There would be five main sets of costs involved in this initiating this major.

### **A recruiter (estimated at \$40,000/year)**

To obtain “the best and the brightest,” a dedicated recruiter would need to be traveling to many high schools actively recruiting the top <1% of students across the state.

### **An advisor (estimated at \$50,000/year)**

To retain “the best and the brightest,” a dedicated academic advisor would need to work with the students. The academic advisor would work with each student (targeting a maximum of 20-25) as well as a separate faculty committee for each student to develop a degree plan and learning objectives and ensure student progress. The advisor would need to understand programs and courses for all of COALS, potentially the entire university.

### **The student (estimated at \$32,000/year for TX residents; \$61,000/year for non-resident)**

If “the best and the brightest” are turning down TAMU because of costs, more than a lack of an individualized major, is an obstacle -- fully-funded scholarships would be needed to attract these missed students to TAMU and retain them.

### **Faculty time (estimated at \$25,000 stipend for the faculty director, \$5,000 each for two committee members)**

Faculty time is fungible and not infinite. If a major attraction of this major would be the flexibility and faculty interaction, these students would require substantial faculty time, which would take faculty away from other impactful activities (classroom teaching, graduate advising, grants, research, extension, etc.). In many cases, such time intensive advising could be similar to a graduate student but without the commensurate publications faculty expect from graduate students. Additionally, in the early period of developing the major, substantial faculty time would be needed to organize this major and get various university approvals. The faculty would also be required to complete annual program assessment. Overall, total faculty lost opportunity costs and decreased productivity in other important areas need to be considered.

### **One additional course**

The individualized major would require at least one additional “Freshman seminar” type course to get students on track and to reduce the burden on faculty mentors in explaining to students how to develop a degree plan and learning outcomes. This class would be essential for setting up such a major for success. Other additional course needs might be identified as the program developed.

## **Description**

### Proposed course description

The Individualized Major is among the most challenging and flexible majors at TAMU in the College of Agriculture and Life Sciences. This major best fits outstanding students with passion for topics that fall in between or outside of existing majors. The Bachelor of Science in Individualized Major allows students to work with an advisor and faculty members to develop their own learning outcomes and degree plan, restricted only by general university requirements, from across the College of Agriculture and Life Sciences as well as throughout Texas A&M University. This degree is specifically designed for outstanding students who know what they are interested in and plan to go to graduate school, start their own business, or have strong intellectual curiosity straddling multiple disciplines. Most students will have upper-level classes in at least two different departments of their and their faculty committees choosing, as well as have classes in entrepreneurship.

### CIP codes

30 .0000 .00 01 Multi-/Interdisciplinary Studies, General

Back up possibility

01 .0000 .00 05 Agriculture, General

### Learning outcomes

The learning outcomes will be designed by the student in consultation with the academic advisor and approved by a faculty committee during their first semester. There are seven TAMU learning outcomes (<https://catalog.tamu.edu/undergraduate/general-information/student-learning-outcomes/>) and each student will need to identify at least one way that they would meet each of the seven. The students will develop a curriculum of classes and activity with a corresponding artifact for each way they plan to meet a learning outcome. The faculty director would be responsible for the assessment of the learning outcomes.

### Program evaluation metrics and procedures

- \* Time to degree/ time to graduation
- \* Retention
- \* GPA
- \* Student demographics / Diversity in enrollment (ethnic, gender, income, on-campus / off-campus housing, first generation, geographic, etc.; [accountability.tamu.edu](http://accountability.tamu.edu))
- \* Student achievements aligned with learning outcomes
- \* Degrees awarded

- \* Post graduation pathways, tracking where graduates go

## Goals

### **The goals of the major for COALS would be expected to include:**

- 1) Attract the best and brightest high school students as freshmen by providing a major tailored to their interests and facilitating self-directed learning.
- 2) Identifying new areas of interest for incoming students beyond existing majors.
- 3) Developing and encouraging new flexibility in degree plans with existing courses which have become too rigid for some majors.

### **The goals of the major for students would be expected to include:**

- 1) Developing a rigorous and challenging curriculum tailored to the interests of individual students.
- 2) Identify customized learning outcomes corresponding to what they want to gain from their education.
- 3) Access to increased interactions with faculty and other advanced students.
- 4) Increased financial support not available elsewhere.
- 5) A path to a fulfilling career and life.

## Purpose

The purpose of the Individualized Major is to attract outstanding students that TAMU-COALS is not currently attracting. This would further increase the overall quality of TAMU-COALS undergraduate students and attract high-achieving students whose desired degree program is not currently offered by departments.

## Administration

The major would be administered by COALS with a recruiter, an academic advisor, and a faculty director to oversee the organization, recruiting, adherence to state and university policies, and reporting requirements. Each student would identify a primary faculty advisor and that advisor with a committee of two other faculty would approve a degree plan and learning outcomes. A program steering committee would assist the faculty director in maintaining consistency of high-quality standards across students.

Students would be recruited into the major before entering TAMU. However, TAMU makes all freshmen admission decisions centrally and the major cannot sidestep this process, but it would be the Task Force’s expectation that these students would be admitted (based on their high school academic and extracurricular records). The first semester they would take required university core classes and an Individualized Major course (a freshman seminar, which could be open to other students) that covers degree plans and learning outcomes. They would be expected to build their

degree plan and learning outcomes throughout the semester with final approval by the faculty committee and academic advisor at the end of their first semester.

### Requirements, electives and a sample four-year degree plan

The core requirements of this major are already constrained by a number of Federal, state, university and departmental policies. Many such policies would be detrimental to the success of the program as stated below.

- 120 credit hours. This state-mandated policy is well intentioned so that students can achieve a BS degree in four years. However, it can also be a significant barrier to the success of the program.
- 42 credits are required for the common core and 78 hours for individualized major classes are required on the degree plan.
- A foreign language requirement would still apply (if not having had a foreign language in high school).
- Requirements for 2 writing intensive (or 1 writing intensive and 1 communication) would still apply. Being on the degree plan would be expected to make the writing “in the major” in this case.
- International and cultural diversity requirements would still apply.
- Cultural discourse requirement would still apply.
- It would be suggested, but not required, that individualized major students take 25 hours of entrepreneurship (e.g., Agricultural Economics, business, ag systems management). We did identify some case studies where other classes were an alternative to entrepreneurship.
- **Sample 120 hour plans are included as case studies in Appendix 2.**

## FAQ: Common stakeholder questions and questions which the Task Force could not answer

**What evidence exists that an individualized major is needed and what indications do we have that this is how we solve missing out on the best students?** There appeared to be two components: (a) top students who applied and did not attend TAMU, and (b) top students who never applied. Dr. Coates cited available data on top students who did not choose to attend TAMUS which said that funding was identified often for why outstanding students made their decision to go elsewhere. If this is true (there was some debate on the semantics and if students were forthcoming on this question), large amounts of scholarship funding would be needed to attract students for an individualized major to work. Our COALS recruiters,

advisors, and Department Heads did not seem to know about such students that we are missing.

**University Studies (e.g. environmental business studies), was largely viewed as a mistake and burden by some participants.** It was somewhat difficult for participants to grasp how the individualized major would be different than University Studies. Additionally, perceptions of the success of University Studies programs within COALS were mixed. University Studies - Leadership is a success in terms of student enrollment (~250 students), retention, and graduation rate, but appears to be not as well recognized. Other University Studies programs within the college may not have been as successful. Participants' varied perceptions of how an individualized major is different is an issue that needs to be addressed.

**How would AP / dual enrollment classes be handled?** Since AP / dual enrollment classes can often count towards the 120 hour degree and we would expect outstanding students would have numerous AP / dual enrollment credits, this could disrupt the major. As each student will have a different amount of credits and a different proposed major, this will have to be handled on a case by case basis. TAMU has AP credits here: <https://testing.tamu.edu/getattachment/AP-IB-Credit/AP-IB-charts-02-03-2020-AP.pdf.aspx?lang=en-US>

**Many classes require prerequisites.** If students are taking upper-level classes in three or more departments, how will the prerequisites fit into a 120-hour degree? Pre-requisite courses will need to be included in the individualized degree plan when it is developed by the student, director and academic advisor; stakeholders did not see any alternative to students taking pre-requisites. It is notable that there are many classes without or with few prerequisites.

**Would incoming freshmen be mature and competent enough to pull together, justify, and complete a degree plan to be successful was raised many times.** The Task Force had discussed the idea that a freshman year, first-semester cohort class could prepare students for developing a learning plan with learning objectives, but substantial participant concerns were still raised.

**How does this major differ from Honors?** While the task force clearly articulated how an Individualized major differed from an Honors program, participants discussed that rejuvenating the COALS Honors Programs might be better than developing an Individualized major at this time.

**Advising and faculty burdens were identified as major concerns.** One or more full-time advisors would be required, which is expensive. Faculty are already

overwhelmed and can feel overburdened. Most participants felt the resources would be better justified elsewhere than serving 20-25 students.

**An exit strategy from the major is needed.** Even the best incoming students won't all make it, or will decide to change majors. Many participants had experiences that suggested superstars in high school don't all handle transitions to the university well. How do we deal with those students who seek to readjust and any the burdens to departments such processes could cause? This topic was something the task force had previously considered, and these discussions reemphasized it is important, but the solution is likely to be case by case. Such students would have to go into a conventional major and are probably going to have credit hours they would not be able to use. This could also impact their ability to get financial aid for having exceeded credit hours.

**What would the name of the major be on the student's diploma and transcript?** This remains unresolved. Likely "Individualized Major with concentration in XYZ" where XYZ would be a mutually-agreed-upon term between the faculty advisory committee and the student in conjunction with the faculty director and steering committee. It was discussed that student might prefer a transcript that just said their created major name (e.g. "XYZ") but it was not clear how this could be possible given other policies and constraints.

**How do we maintain diversity and make the program equitable to those that are under-represented?** This remains unresolved, an open question that begins with recruiting and continues through retention strategies.

**What about culture without a department?** A ready-made culture would be less available than it is with departmental majors. Several ideas were discussed that could help with forming a culture around such an individualized major including:

1. Creating a living community for incoming freshman, similar to Mays Business School.
2. Participation in existing student clubs. However, there were concerns that a lot of the best students are already being lost from student club department activities to things like Ducks Unlimited or clubs that are less academic.
3. Culture might be created specific to the individualized major through the freshman course.

**Does the Registrar have flexibility to deal with degree planners and degree audits for an undergraduate individualized major? How would financial aid be dealt with?** These remain open questions.

**How was the cost per student estimated?** The anticipated costs per student in the first year assumed the cost of a recruiter, an advisor, and faculty time divided between five students, in subsequent years this cost would decrease as more students are added into the program. However, adding fully funded fellowships for each student would substantially increase the cost per student. As the program expands (over years, or with the addition of transfer and change-of major students), the costs per student would decrease.

## Appendix 1 - Example individualized major information from other schools

The six land-grant institutions that the task force found some evidence of existing or previously existing individualized majors included: University of Connecticut, Cornell University, University of Wisconsin – Madison, University of Kentucky, University of Vermont, University of Nebraska – Lincoln. However, in many cases these were poorly documented; links are provided at the end of this appendix 1.

### Sample Individualized Major Program Descriptions

\*Note. Taken directly from university websites and not all other schools

#### University of Connecticut – Individualized Major in the College of Agriculture, Health and Natural Resources

The Individualized Major program allows students to create a major that is not otherwise offered at the University of Connecticut. Students pursuing an Individualized Major must meet all university-level and college-level requirements for graduation and complete at least 36 credits numbered 2000 or above. Requirements for declaring and completing an Individualized Major are listed below:

Students must be in good academic standing with a minimum GPA of 2.5 to declare an Individualized Major.

Students must submit a proposed statement of purpose and identify three faculty members who are willing to serve as an advisory committee.

An Individualized Major has a minimum of 36 credits numbered 2000 or above courses which must: be from two or more departments; include at least 18 credits from departments in the College of Agriculture, Health and Natural Resources; be approved by the student’s advisory committee; be taken at the University of Connecticut; have a combined Grade Point Average of at least 2.5; include no more than 6 credits of Independent Study and Internship; not to be taken on Pass/Fail; meet all requirements of the “36 Credit Group” of the College of Agriculture, Health and Natural Resources

The writing in the major and information literacy requirements will be satisfied by meeting these requirements for any of the majors within the College of Agriculture, Health and Natural Resources.

#### Butler University – Individualized Majors Programs

Are you having trouble finding a major that fits your unique interests, talents, and career goals? Do your interests cut across disciplinary boundaries and not fit within existing majors? Then the Individualized Major (IM) may be for you.

In the IM program, you'll work with a faculty advisor to create a one-of-a-kind major combining your choice of courses with an approved experiential learning component, such as an internship, extended study abroad, an honors or departmental thesis, a senior seminar, or a service-learning project. Some students combine an IM with a traditional major or minor.

Butler graduates have earned Individualized Major degrees in such areas as Asian Studies, Italian Culture, Principles of Design, Ancient Egyptian and Museum Studies, The Social-Cultural Bases of Religious Experience, Medical Illustration, and Urban Relationships and Development.

### **Indiana University School of Liberal Arts at IUPUI – Individualized Major Program**

The Individualized Major Program (IMP) in the School of Liberal Arts is a special option that enables students to design programs of study that lie outside the scope of existing major programs. Unlike conventional majors with specific requirements and lists of courses to be taken, in the Individualized Major, students work with faculty members to develop a plan of study that is custom designed to fit individual needs and interests. The IMP differs from the bachelor's degree in general studies, which is based on a broad interdisciplinary plan of study, in that the IMP requires a clearly defined concentration that connects to areas of study in the School of Liberal Arts and may draw its curriculum from various disciplines and schools. Students collaborate closely with their faculty advisor in planning their courses of study and in completing senior capstone projects. To ensure the integrity and rigor of each student-designed major, a faculty committee approves all Individualized Majors when students are first admitted to the program and again once their studies are complete

## **Sample Individualized Major Learning**

**Outcomes** \*Note. Taken directly from university websites.

### **Cabrini University – Individualized Major**

As part of the curriculum development process, each student will develop their own unique learning outcomes, focusing on knowledge and skills appropriate to their program.

### **Gettysburg College – Interdisciplinary Studies**

draw on more than one disciplinary perspective in approach to chosen area of study.

express ideas clearly and complexly in one or more chosen media.

recognize and articulate meaningful questions in the chosen area of study.

reflect on learning within their major.

### **University of Louisville – Liberal Arts**

1. Learn to address complex issues from the point of view of a number of relevant disciplines.
2. Demonstrate a knowledge of the basic content and methods of the 3-5 areas of concentration chosen by the student.
3. Demonstrate the ability to write and speak about issues from the perspectives of the disciplines in which the student has chosen concentrations.

### **University of Maryland – Individual Studies Program**

1. Students will gather information and demonstrate an understanding of defining concepts from three or more areas of study and will combine those concepts to propose a unique major to be independently pursued.
2. Students will apply the concepts of their unique area of study in an internship or an independent study project.
3. Through a senior capstone project, students will show that they have integrated the different areas of study in their interdisciplinary major to examine questions, problems, or issues raised in their interdisciplinary field.

## **Schools with individualized majors links**

We did not find complete information on these individualized majors and in some cases they did not look to currently be active.

### **Universities with Individualized Majors**

#### **University of Connecticut**

[https://iisp.uconn.edu/about-the-individualized-major/#:~:text=An%20individualized%20major%20\(IMJR\)%20is,at%20the%20University%20of%20Connecticut.](https://iisp.uconn.edu/about-the-individualized-major/#:~:text=An%20individualized%20major%20(IMJR)%20is,at%20the%20University%20of%20Connecticut.)

#### **Cornell University**

<https://as.cornell.edu/education/independent-major>

**University of Louisville**

<https://louisville.edu/liberalstudies>

**University of Indiana**

<https://college.indiana.edu/academics/degrees-majors/major-guides/individualized-major-program-ba.html>

**University of Wisconsin – Madison**

<https://guide.wisc.edu/undergraduate/letters-science/college-wide/individual-major-bs/>

**University of Washington**

<https://indiv.washington.edu/design-your-own-major>

### **Universities with Individualized Majors in Agriculture**

**University of Kentucky - Agriculture**

<https://www.uky.edu/academics/bachelors/agriculture>

**University of Vermont - Agriculture**

[https://www.uvm.edu/cals/self\\_design\\_major\\_proposal\\_process](https://www.uvm.edu/cals/self_design_major_proposal_process)

**University of Nebraska – Lincoln - Agriculture**

<https://catalog.unl.edu/undergraduate/agricultural-sciences-natural-resources/integrated-science/>

## Appendix 2 - Case study example scenarios for a four year COALS Individualized Major

### Case Study – Individualized Major for ‘International Executive Farm Management’

An incoming high school student, Carsten Smith, wants to pursue a career in managing large international corporate farms, which typically employ more than 100 employees, have a gross profit exceeding \$30 million per year, and operate in rural areas in underdeveloped countries. He would need to have expertise in finance, basic knowledge in production agriculture, and understand human resource management along with good leadership skills and an ability to operate internationally.

He is entering Texas A&M University without any AP or dual credits. Carsten has made a list of potential courses that he thinks would contribute to an individualized major. Most of his courses would be AGECE, but many of those courses that he wants to take require several prerequisites. He has already had Spanish as a foreign language in high school, but thinks he should learn either Russian or Arabic.

#### Discussion Questions:

1. Which of these courses should he take?
2. Did he omit any important courses?
3. Should he include an internship, study abroad, or some other high-impact learning experience?
4. Could his academic goals be met with a conventional degree or does he need an individualized major?

Category	Courses	Semester Course Hours
<b>University Core Curriculum</b>		(42)
	Communication	6
	Mathematics	6
	Life & Physical Sciences	9
	Language, Philosophy, and Culture	3
	Creative Arts	3
	American History	6
	Government/Political Science	6
	Social & Behavioral Science	3
<b>- Potential Courses -</b>		
<b>Ag Comm &amp; Journalism</b>		(12)
	AGCJ 105 ‘Intro Ag Comm’	3

	AGCJ 312 'Editing for Ag Audiences'	3
	AGCJ 313 'Ag Media Writing I'	3
	AGCJ 413 'Emerging Media in Ag'	3
<b>Agricultural Economics</b>		(51)
	AGEC 105*	3
	AGEC 314*	3
	AGEC 317*	3
	AGEC 447 'Food & Ag Price Analysis'	3
	AGEC 452 'Int'l Trade and Ag'	3
	AGEC 453 'Int'l Ag Bus Mgt'	3
	AGEC 440 'Agribusiness Strategic Analysis'	3
	AGEC 340*	3
	FINC 341*	3
	MGMT 363*	3
	MKTG 321*	3
	AGEC 429 'Ag Policy'	3
	ECON 202*	3
	AGEC 424 'Ag Business - Economic Analysis'	3
	AGEC 425 'Ag Business- Financial Analysis'	3
	ACCT 209*	3
	AGEC 408 'Econ of Foreign Intervention'	3
<b>Agricultural System Mgt.</b>		(9)
	AGSM 335 'Water and Soil Mgt'	3
	AGSM 360 'Occupational Safety Mgt'	3
	AGSM 435 'Irrigation Prin & Mgt'	3
<b>International Business</b>		(12)
	IBUS 401 'Global Marketing'	3
	MKTG 321*	3
	IBUS 'Int'l Accounting'	3
	ACCT 327*	3
<b>Foreign Language</b>		(11)
	Beginning Foreign Language	8
	Intermediate Foreign Language	3
<b>Miscellaneous</b>		(24)
	ALEC 350 'Global Ag Issues'	3
	ALED 422 'Cultural Pluralism in Ag'	3
	ANSC 107 'Intro to Animal Science'	3

	ECON 323 'Microeconomics Theory'	3
	INTS 201 'Intro to Int'l Studies'	3
	PLPA 303 'Plant Pathology'	3
	RENR 405 'GIS for Resource Mgt'	3
	SCSC 301 'Soil Science'	3

\*prerequisite courses

## Case Study – Individualized Major for ‘Urban Agriculture’

Lauren Wedsel is an incoming transfer student from Blinn College who wants in individualized major in ‘Urban Agriculture’. Her career goal is to develop Community Supported Agriculture systems including hydroponic greenhouses and growing modules within urban landscapes. She will be transferring 30 credit hours from Blinn and using dual credits from high school. These credits will take care of 30 SCH of the UCC requirements, but she will also use 15 SCH that can probably only be used as electives. This gives her 75 SCH with which to construct an individualized major. She will also still need to take 2 writing intensive courses (6 SCH) and 2 courses (6 SCH) that will meet the International Cultural and Diversity requirements. Lauren also wants to participate in a study abroad program.

### Discussion Questions:

1. Which potential courses should she take?
2. Did she omit any important courses?
3. Should she include an internship?
4. Could her academic goals be met with a conventional degree in Horticulture, or does she need an individualized major?

Category	Courses	Semester Course Hours
<b>University Core Curriculum</b>		(42)
	Communication	6
	Mathematics	6
	Life & Physical Sciences	9
	Language, Philosophy, and Culture	3
	Creative Arts	3
	American History	6
	Government/Political Science	6
	Social & Behavioral Science	3
<b>- Potential Courses -</b>		
	ACCT 209 Survey of Accounting Prin.	3
	AGEC 105 Intro to Ag Econ	3
	AGEC 216 Fund. Of Ag Food Sales	3
	AGEC 314 Mkt Ag and Food Products	3
	AGSM 201 Ag Energy and Power Systems	3
	AGSM 403 Occupational Safety Mgt	3
	AGSM 315 Food Processing Eng Tech	3
	AGSM 417 Food Processing Eng Tech II	3
	AGSM 435 Irrigation Prin & Mgt	3
	ENTO 201 General Entomology	3
	ENTO 401 Prin of IPM	3
	ENTO 403 Urban Entomology	3

	ESSM 306 Plant Function Ecology & Adaptation	3
	EVEN 301 Environmental Engineering	3
	FINC 341 Business Finance	3
	ACCT 230 Intro Accounting *	3
	FRSC Arboriculture	3
	HORT 201 Hort Sci & Practice	3
	HORT 301 Garden Sci	3
	HORT 302 Garden Sci Lab	1
	HORT 308 Plants for Sustainable Landscapes	3
	HORT 325 Veg Crop Production	3
	HORT 326 Plant Propagation	3
	HORT 335 Sociohorticulture	3
	HORT 428 Greenhouse Tech	3
	HORT 435 Urban Horticulture	3
	IDIS 240 Intro to Indust. Distribution	3
	ISTM 209 Business Information System Concepts	3
	NFSC 201 Food Sci	3
	NFSC 311 Prin of Food Processing	3
	PLPA Plant Pathology	3
	PSYC 251 Survey of Indust/Organization Psych	3
	SCMT 303 Stat Methods	3
	SCSC 301 Soil Science	3
	SCSC 302 Rec Turf	3
	SCSC 309 Water in Soils and Plants	3
	SCSC 315 Hemp Production and Utilization	3
	SOSI 322 Industrial Sociology	3
	URPN 201 The Evolving City	3
	URPN 360 Issues in Environmental Quality	3

\*prerequisite courses

## Case Study – Bioremediation / Environmental Engineering

**Bioremediation** is the use of microbial species to clean up soil and groundwater that has been contaminated by discharged chemicals. A curriculum of this sort would prepare students for work and in fields related to environmental protection and remediation.

Biology 1  
 Biology 2  
 Calculus 1  
 Calculus 2  
 Calculus 3  
 General Chemistry 1  
 General Chemistry 2  
 Engineering graphics/ Spatial sciences  
 PHYS 1  
 PHYS 2  
 Organic Chemistry 1 + lab  
 Organic Chemistry 2 + lab  
 STAT 302 Statistics

### **Courses (likely to be others)**

BESC 367	U.S. Environmental Regulations
BIOL 438	Bacterial Physiology
ESSM 301	Wildland Watershed Management
ESSM 311	Biogeochemistry and Global Change
ESSM 320	Ecosystem Restoration and Management
GEOG 203	Planet Earth
GEOG 312	Data Analysis in Geography
GEOL 420	Environmental Geology
MICRO 351	Microbiology
RENr 205	Fundamentals of Ecology
RENr 470	Environmental Impact Assessment
URPN 360	Issues in Environmental Quality
URPN 371	Environmental Health Planning and Policy
WFSC 414	Ecology of Lakes and Rivers
WFSC 428	Wetland Ecosystem Management

Core

Internship: Texas Water Resources Institute, others, etc.

### Case Study – Data science for agricultural decisions

Becky is a highly accomplished high school undergraduate who has taken 12 AP courses and will come in to TAMU as a sophomore. Her goal is to develop a software that will help her and her mother to make better decisions for sustainable agriculture on their fourth generation row crop farm. She sees a problem and an opportunity: the tractors, combine and sprayers all collect a lot of data and she wants to use that data combined with the free data from Google and USDA to balance her family farms production with environmental protection, less work but more profit as well as social justice – she is also an accomplished pianist. Where does she major? Computer science would teach her how to code and think about data and computers but not about agriculture. BAEN will teach her how to be an engineer of machines or microbes but not about sustainable agriculture. SCSC would teach her how to do precision agriculture, but nothing about programming or data analysis. Horticulture might teach her about sustainable agriculture but not about production or coding. Furthermore, where would she further her knowledge of her artistic side. She does not think she wants to be an entrepreneur.

## Case Study – AG POLICY

### Potential Student

- Has interest in government, policy, communications, political science
- Participated in Model UN, Speech & Debate, Student Government, Boys State/Girl State
- Grew up on a farm/ranch or interested in agriculture
- Participated in 4-H, FFA, Livestock Ambassadors/Advocacy Academy, 4-H Day at the Capital, Agricultural Issues Forum, FFA Legislative Experience, Farm Bureau Youth Leadership Conference
- Might want to go to law school

### Potential Careers

- Lobbyist
- Policy Analyst
- Government Agency Employee
- Agricultural Economist
- Legislative Assistant, Director or Staffer
- Public Office
- Agricultural Lawyer

### Classes

- AGCJ 105 - Introduction to Agricultural Communications
- AGCJ 306 - Theory and Practice of Agricultural Public Relations
- AGCJ 404 - Communicating Agricultural Information to the Public
- AGECE 105 - Introduction to Agricultural Economics
- AGECE 217 - Fundamentals of Agricultural Economics Analysis
- AGECE 314 - Marketing Agricultural and Food Products
- AGECE 344 - Food and Agriculture Law
- AGECE 408 - Economics of Foreign Intervention, Conflict and Development
- AGECE 420 - Food Security, Climate and Conflict
- AGECE 429 - Agricultural Policy
- ALED 400 - Public Leadership Development
- ANSC 107 - General Animal Science
- ANSC 495 - International Agriculture and Animal Production
- COMM 302 - The Mass Media and Politics
- COMM 440 - Political Communication
- POLS 200 - Foundations of Political Science
- POLS 232 - Introduction to Public Policy
- POLS 327 - Congressional Politics
- POLS 347 - Politics of Energy and the Environment
- SCSC 105 - World Food and Fiber Crops
- SCSC 410 - International Agricultural Systems

### Capstone/Internship/Research

- Study Abroad
  - Spain Business Study Abroad (International Business, Business Management)
  - South Africa Business Study Abroad (International Business)
  - Poland - TALL Emerging Leaders Program (Agricultural Leadership)

- Internship
  - Agricultural and Natural Resources Policy Internship Program

**Other Possible Options at TAMU**

- Master of Public Service and Administration
  - The Bush School of Government & Public Service and the Department of Agricultural Economics offer a 5-year (3+2) degree program that allows agricultural economics majors to enter the Bush School at the start of their senior year (typically year four) at Texas A&M University. This enables students to receive both their Bachelor of Science in Agricultural Economics (B.S. AGEC) and a Master of Public Service and Administration (MPSA) graduate degree, with a track emphasis in public policy analysis (PPA), in five years. The program includes a total of 151 hours with 17 hours double-counting to both degrees.
- Bachelor of Science in Agricultural Economics, Policy and Economic Analysis Option