

## Key Elements for Integrating a Semester Long Abroad Program into the Engineering Curriculum

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Dr. Maria Claudia B. Alves is the senior Director for the Halliburton Engineering Global Programs at Texas A&M University. She has been in this position since July 2012. In this position she is responsible for internationalizing the research and education activities of the College of Engineering. Under her leadership the college has significantly increased the number of students studying abroad, established new models of study abroad including co-op and research abroad and established meaningful connection for research and attraction of funded international graduate students. Maria started working at Texas A&M in 2005 as Assistant Director for Latin American Programs and in 2009 she was promoted to Program Manager for South America in the same office. During her time at the Office for Latin America Programs she created, managed and developed projects to enhance the presence of Texas A&M University in Latin American and to support in the internationalization of the education, research, and outreach projects of the university. She was charged with the development and implementation of a strategic plan for Texas A&M in South America. While at the Office for Latin America Programs, Maria was also part of the team creating and the opening the Soltis Center in Costa Rica. Maria speaks three languages fluently (Spanish, Portuguese and English) as well as intermediate French. Maria is originally from Brazil and completed her undergraduate studies at Lynn University in Florida, where she graduated with honors in Business Administration in 2002. She was part of the tennis team and was the team captain for two years, including the year the team was NCAA National Champion in 2001. She is a December 2003 graduate of the MS-Marketing program at Texas A&M University. And in the 2017, she graduated with a PhD in Higher Education Administration.

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## Abstract

Research studies have consistently shown that study abroad changes people's lives for the better in terms of personal growth, interpersonal relationships, [1, 2, 3] and subsequent long-term career benefits. The longer the program, the more effective these positive impacts of a global experience are on individuals [4].

Semester-long reciprocal exchange programs provide a lasting and impactful experience, but it is not always easy to find classes that are both transferrable and can satisfy a student's degree plan. This may be a reason why students prefer short term/midterm global programs, making the participation of engineering students in long-term study abroad programs quite low.

For two years, we have deployed and implemented a faculty-led semester program (CVEN Rome Program) more befitting of an engineering student's degree plan to encourage participation in a semester-long program without delaying their graduation. The CVEN Rome program has been offered for two consecutive years, Spring 2019 and Spring 2020, with over 30 students enrolled each semester. Course variety is offered in an effort to attract the entire student population of the Civil Engineering department (primarily at the Junior classification). The classes are also made available to all other engineering students, allowing them to join by registering for (at least) two on-site classes, utilizing their elective selections and taking some classes online to complete their required semester load.

The CVEN Rome Program has a well-balanced schedule emphasizing group activities and personal time without compromising the quality of education. It is embedded into the context of a historical city (Rome, Italy), which offers a variety of advantages for program deployment. In particular: a welcoming host university with a strong engineering focus; an experienced local provider for logistics and accommodation; the availability of qualified engineering internship opportunities for students to partake in during the program; a culturally and technically-rich city that provides students with both academic and personal enrichment; a world-renowned touristic destination; and a natural hub for personal traveling.

The purpose of this paper is to share with the global engineering education community how the CVEN Rome Program was developed and implemented, the lessons learned, and the program's impact on students.

### **i. Program Description**

The objectives of this ambitious and novel program, called CVEN Rome Program, align with the current goal of the College of Engineering (Halliburton Engineering Global Programs) at Texas A&M University to provide our students with international experiences to be better prepared to work and succeed in a changing global economy. This program offers our students a unique and invaluable opportunity to be part of an experience to remember for a lifetime and provides them with a full range of high impact experiences for lifelong learning. Study abroad positively

influences people in terms of personal growth, interpersonal relationships, and long-term career benefits; the longer the program, the more impactful it is [4].

The CVEN Rome program is located in Rome, a city which is widely recognized as one of the most culturally-rich cities in the world. Students have a unique opportunity to experience a variety of civil engineering and project management problems and solutions within a diverse context, cultural priorities, and traditions. In addition, students are able to interact with peers from different cultures and who are not native English speakers, resulting in a truly unforgettable and enriching international experience both from academic and personal perspectives.

## **ii. Program Initiation and Development**

The idea for the CVEN Rome Program began in late 2015, following a presentation given by the representatives of the Halliburton Engineering Global Program at Texas A&M University encouraging interested faculty to develop study abroad programs to increase student participation in global experiences, including semester-long programs. It took approximately three years to develop program details and structure, define the implementation mechanism, and obtain the formal approval to begin recruitment for Spring 2019, the CVEN Rome Program's first semester.

The Halliburton presentation took place in Fall 2015, right after the 2014-15 academic year, which Dr. Quadrifoglio spent in Italy at Roma Tre University for his Faculty Developmental Leave. During this time, he had the opportunity to meet and become well-acquainted with local faculty. This gave Dr. Quadrifoglio the idea to develop the program in collaboration with them.

Coincidentally, Dr. Quadrifoglio was about to spend another semester (Spring 2016) in Italy for a Fulbright Award Project. This offered the opportunity to continue to move the CVEN Rome Program idea forward, discussing its potential development and deployment with Roma Tre administrators and faculty. The basic model included five engineering classes. Dr. Quadrifoglio would teach two courses (counting for his Spring semester teaching load), while the other three would be taught by instructors from Roma Tre. The Roma Tre professors were identified, vetted, and hired as adjunct faculty by Texas A&M. The idea was very well received by Roma Tre representatives, as the initiative would foster and expand their international collaborations.

The most challenging aspect of program development was matching the set of classes identified by our undergraduate office as valuable for our students with faculty members from Roma Tre who were qualified and available to teach those courses. Dr. Quadrifoglio discussed the CVEN Rome Program with the Texas A&M Civil Engineering Undergraduate Office to develop a list of classes for a semester-long abroad program. Classes should preferably not include lab components, as this would link them to Texas A&M location and facilities. This list included 6-7 candidate classes, mostly at the Junior level, and was the starting point for a final selection in collaboration with the Roma Tre potential adjunct faculty members. Dr. Michele La Rocca (Roma Tre) was already teaching an equivalent to CVEN311 (Fluid dynamics, required for all our civil engineering students) for another US abroad program and he immediately gave his availability to do the same for us. Dr. Stefano Carrese, a close colleague of Dr. Quadrifoglio, gave his availability to teach CVEN307 (Transportation Engineering, required for most our civil engineering students) and Dr. Paolo Ballato, faculty from the Geology Department, was happy to

teach GEOL320 (Geology for Engineers, a popular technical elective for our engineering students). Those three classes, in addition to the two taught by Dr. Quadrifoglio (CVEN322, Civil Engineering Systems, and CVEN349, Civil Engineering Project Management, both required for most our civil engineering students), were eventually deemed suitable to offer a full semester abroad to our CVEN (civil engineering) students. All the courses were offered in English following the Texas A&M syllabus as the CVEN ROME program is a faculty led program where students enroll in Texas A&M courses and not Roma Tre courses.

### **iii. Organizational Structure**

The CVEN Rome Program has been deployed twice so far with this main structure:

- Dr. Luca Quadrifoglio, associate professor within the Zachry Department of Civil and Environmental Engineering at Texas A&M University, led and supervised the program for its entire duration. Dr. Luca Quadrifoglio is an Italian native and had already led 5 successful Summer Study Abroad Programs in Italy for Texas A&M: 3 in Trieste and 2 in Rome (Maymester).
- Roma Tre University, one of the three universities in Rome, hosted the CVEN Rome Program by providing classroom facilities and necessary information technology resources at no cost to TAMU. In addition, it facilitated the identification and engagement of the adjunct faculty.
- ACCENT International, a highly qualified provider of study abroad programs with more than 25 years of experience, provided all logistics and accommodation arrangements, as well as the internship opportunity and the 24/7 emergency support (this was especially critical during Spring 2020 with the Covid-19 pandemic, when Texas A&M University recalled students from the program in March 2020). ACCENT was already in collaboration with Dr. Quadrifoglio for the Maymester programs in Rome in 2016 and 2017.

### **iv. Calendar and Schedule:**

#### *Spring 2019*

The CVEN Rome Program (Jan 18<sup>th</sup> - May 11<sup>th</sup>, 2019) spanned over approximately 16 weeks, including 2 breaks (first week of March and Easter week). Classes were scheduled Monday through Thursday; students were off Fridays to allow for group weekend trips or for students' personal travel. Since the program was over 90 days, students applied for the student visa.

#### *Spring 2020*

A similar schedule was planned in 2020 (Jan 17<sup>th</sup> – May 9<sup>th</sup>, 2020); however, the program was cut short in early March due to the COVID-19 pandemic emergency. Students were requested to return to the US and classes were completed online.

### **v. Classes**

The CVEN Rome Program was designed to offer our students a full semester abroad with 5 classes available onsite; two were taught by Dr. Luca Quadrifoglio and the other three by

qualified faculty from Roma Tre University, approved by Texas A&M University as adjunct faculty. Course offerings correspond roughly to a CVEN Junior semester. As anticipated before, the classes offered were as follows:

- CVEN322 (Civil Engineering Systems), Dr. Luca Quadrifoglio, Associate Professor, Texas A&M.
- CVEN349 (Civil Engineering Project Management), Dr. Luca Quadrifoglio
- CVEN307 (Transportation Engineering), Dr. Stefano Carrese, Full Professor, Roma Tre
- CVEN311 (Fluid Dynamics), Dr. Michele La Rocca, Full Professor, Roma Tre
- GEOL320 (Geology for Engineers), Dr. Paolo Ballato, Associate Professor, Roma Tre

Classes are parallel sections of the regular Texas A&M same classes, just taught abroad. Therefore, they are based fully on typical Texas A&M syllabi, as if taught on the main campus, all in English with homework assignments, midterms, and final/project, wherever appropriate. Thus, there is no Italian language requirement. Of course, those being taught by Roma Tre faculty will naturally have some Italian style and components, but still abiding to ABET learning objectives. All but GEOL320 are required prerequisites for other classes in the civil engineering curriculum.

In order to attract and recruit more students, we added flexibility in selecting classes to be eligible to join. In particular, students were required to select a subset (at least two) of the five on-site classes and complete their semester load by registering for Texas A&M online classes suitable for their degree plan. Thus, had civil engineering students already completed one or two of the CVEN Rome Program's classes, they were still eligible to join. In addition, students from other engineering departments could also use their elective spots to register for two of the CVEN Rome Program's classes and complete their semester load with available online classes suitable for their major.

We also allowed Texas A&M students to register for additional classes in Roma Tre; these included some engineering classes, but in particular Social Science and Humanities electives, some of which are available for small registration fees also for international non-degree granting students at Roma Tre. The option is available and was explored by some students, however the challenge resided in the compatibility of the Roma Tre syllabi for approval by Texas A&M and in particular in the different schedules, as the Italian second semester typically runs from March to July, approximately 1.5 months unsynchronized with respect to the Texas A&M Spring semester (including the CVEN Rome Program). The above issues prevented students from further pursuing this option, despite their initial interest. We will continue to explore and offer the possibility to our students, and evaluate each potential class on a case-by-case basis.

Roma Tre has established and approved a mechanism to allow their own students to attend the CVEN Rome Program's classes for academic credit as a substitution for some of their Italian degree plan. Italian students are able to join at no cost to them. Two Italian students took advantage of the opportunity in 2020 and we are hoping to grow the number in the future. In addition, they can sign up for and join the program's extra-class activities (tech visits, excursions, group meals, etc.), whenever logistically feasible. This is intended to share some of

the CVEN Rome Program's value with the host university and to foster integration and interaction among students from the two institutions.

As a part of the agreement with Roma Tre, local Italian teaching assistants (typically graduate students) are hired to assist in the program's classes.

#### **vi. Extra-class Activities**

The CVEN Rome Program is designed to offer a full academic semester to students, providing classes to fulfill their Spring academic duties as if doing it on the main campus in College Station. In addition, a variety of group activities are also planned and included in the programs' fee to enrich the students' experience. Our provider (Accent) is responsible for all logistics and organizational details in collaboration with Dr. Quadrifoglio's inputs and recommendations. In particular, the program also offers:

- Four mandatory technical/cultural weekend trips:
  - 3 days/2 nights in Florence (visiting Accademia and Uffizi museums. Half day wine tour in the Chianti area) in the Tuscany neighboring region
  - 2 days/1 night in Orvieto (also visiting Assisi) in the Umbria neighboring region
  - 3 days/2 nights in Sorrento (visiting Pompeii archeological site and Capri) in the Campania neighboring region
  - 2 days/1 night in L'Aquila (earthquake tech visit and half day in Campo Imperatore in the Appennini Mountains) in the Abruzzo neighboring region
- Technical and cultural visits:
  - Colosseum/Imperial Fora
  - Vatican museum
  - Roman aqueduct system (tech visit)
  - Bridgestone race track (tech visit)
  - Peschiera: Water plant of the natural springs of Roman water supplying Rome and its surroundings (tech visit)
- 10-hr survival Italian class
- A *Serie-A* soccer match (as a group)
- Roughly 15 group meals and one cooking class

In addition to the several activities above and the necessary time for studying, the CVEN Rome Program includes 3-4 long free weekends (Fridays are off) and two 10-day breaks for students, which are highly encouraged to take advantage of their time abroad to exit their Texas A&M "safe bubble" and pursue their personal interests and conduct their own activities and travel/excursions to other Italian or European destinations. Our local provider Accent also provided them with several options/suggestions and a-la-carte activities to enrich their experience socially and culturally with the local community. Students have fully taken advantage of these opportunities, even beyond expectations, with several diverse trips.

## **vii. Internships**

The CVEN Rome Program offered optional internship experience opportunities through our provider ACCENT, with multi-year experience in successfully placing an average of about 70 US students per year into local part-time stage/internship programs in various fields for other abroad programs. These internships are accompanied by an extensive orientation, covering several important aspects of employment in Italy. Students work 6-8 hours/week and are supported by an internship coordinator and their internship mentor. This was a unique opportunity to immerse students in the culture and help them break from the “faculty led bubble”.

In 2019: Seven of our students had the opportunity to be selected for local internships. Three were employed at Roma Tre research labs (two in Transportation, one in Structures), three worked at a water resources company, and one at an oil company.

In 2020: Five of our students had the opportunity to be selected for local internships. All were offered employment at local engineering firms. Students participated in their internship for four weeks until it was interrupted and canceled due to the COVID-19 pandemic.

## **viii. Recruitment and Enrollment**

The recruitment for the CVEN Rome Program begins well in advance (approximately 1 year before the start of the program) and is based on periodic Texas A&M emails, social media and digital ads, on-campus flyers and yard signs, in-class presentations and Zoom info sessions by Dr. Luca Quadrifoglio, and webinars in collaboration with Accent.

Applications are accepted around March/April through October 1 and are based on several eligibility factors such as a minimum GPA of 2.5, prerequisites, and other competitive items, including a short essay. Students are evaluated and accepted on a rolling basis up to a maximum of 40 (current cap for logistical agreements with Roma Tre).

Once program application is closed (October 1<sup>st</sup>), and students are confirmed (October 15<sup>th</sup>), orientations and logistics preparations start. Student billing, provider payment, flight information, and visa requirements are important actions taking place during this time. A visa is required to enter Italy for US citizens if they stay for more than 90 days. The semester-long program is approximately 115 days, so a visa was required and obtained for all participants. The bulk request (all requests collected and mailed together) greatly sped up the process and did not require travel to the consulate. This is a great help and relief for students, who would otherwise be required to provide individual requests at the consulate; however, it requires centralization and effort of document collection prior to mailing. It is debatable whether it's worth keeping the program at 115 days with a visa, rather than reducing it to within 90 days to eliminate the visa burden.

The CVEN Rome Program enrolled the following students in the first two years:

Major	2019	2020
Civil Engineering (CVEN)	25	20
Industrial Distribution (IDIS)	5	7
Industrial and Systems Engineering (ISEN)	1	1
Computer Science and Engineering (CSCE)		2
Mechanical Engineering (MEEN)		1
Petroleum Engineering (PETE)		1
Total	31	32

Fig. 1. Major distribution by cohort.

Students registered for classes with this distribution:

Course	2019	2020
CVEN307:	20	19
CVEN311:	24	15
CVEN322:	30	30
CVEN349:	29	32
GEOL320:	10	14
TAMU online classes:	14	29

Fig. 2. Course taken by cohort.

### ix. Program Funding Structure

Faculty led semester programs can be very expensive for the students and for the institution. Therefore, as we designed the CVEN Rome Program, making it affordable for the students and sustainable for the college of engineering and civil engineering department was very important. Below we describe those costs and steps taken to keep them low.

#### *Student Cost Spring 2019 and Spring 2020*

CVEN Rome Program fee per student was \$7,900 and included the items listed below. In addition to the program cost, students also had to pay TAMU Spring flat tuition (~\$6,000) as if they were taking those courses in College Station, roundtrip airfare (~\$800), and other meals and personal expenses (~2,500). With those costs, the total estimated cost of the program is \$17,200. It is very reasonable when comparing it with the cost of spending the semester enrolled in College Station, which is estimated by Texas A&M to be \$15,714 [5]. Notably, a number of Scholarships were also available and awarded based on merit and need in both years. Post-program survey results indicated students found the cost to be fair. Results of the survey are presented later in this paper.

Student program fee included:

- Accommodation in shared apartments for the entire duration (\*)
- Transit pass (entire program duration)
- Four mandatory technical/cultural weekend trips (logistics/hotels/guides/entrance fees)
- Technical and cultural visits (logistic/guides/entrance fees)



- 10-hr survival Italian class
- 15 group meals and one cooking class
- One ticket to Serie A soccer match
- CISI insurance coverage and TAMU administrative fee
- Faculty travel cost

*(\*) An optional Home-Stay accommodation was made available to students for an additional cost. Students live with a typical Italian family and are provided breakfast and dinner for 5 days per week. This gives them an even more culturally immersed global experience. One student in 2019 and one in 2020 opted in.*

Maintaining cost per students as close as possible to the cost of living in College Station while building a unique experience was a key factor in program development. Having Accent as the program provider allowed us to maximize the cost/quality benefit. In addition, the partnership with Roma Tre providing the space free of cost and having a faculty member who is a native Italian allowed us to remove some of the expenses that are usually transferred to students in the program, such as classroom space cost and faculty housing in a short-term lease or hotel.

#### *Institutional Cost Structure – Spring 2020 and Spring 2019*

The institutional cost was split between the College of Engineering and the Department of Civil Engineering. While the Civil engineering Department covered the Spring teaching load of Dr. Quadrifoglio, the College of Engineering – Halliburton Engineering Global Programs compensated the adjunct faculty teaching time through the Roma Tre partnership.

#### **x. Student Demographics**

The two cohorts of students were fairly diverse. The 2019 cohort was comprised of 48% females and 52% males. The percentage of students who identify as White was 64.5, with 35.5% of the students identifying as Asian; Black/African American; Hawaiian/Pacific Islander; Hispanic/Latino/a; or Native American. The 2020 cohort was comprised of 47% females and 53% males. The percentage of students who identify as White was 47%, with 53% of the students identifying as Asian; Black/African American; Hawaiian/Pacific Islander; Hispanic/Latino/a; or Native American. Out of those students, 65% identified as Hispanic/Latino/a. While the gender distribution remained fairly similar from 2019 to 2020, the racial and ethnic diversity increased from 2019 to 2020.

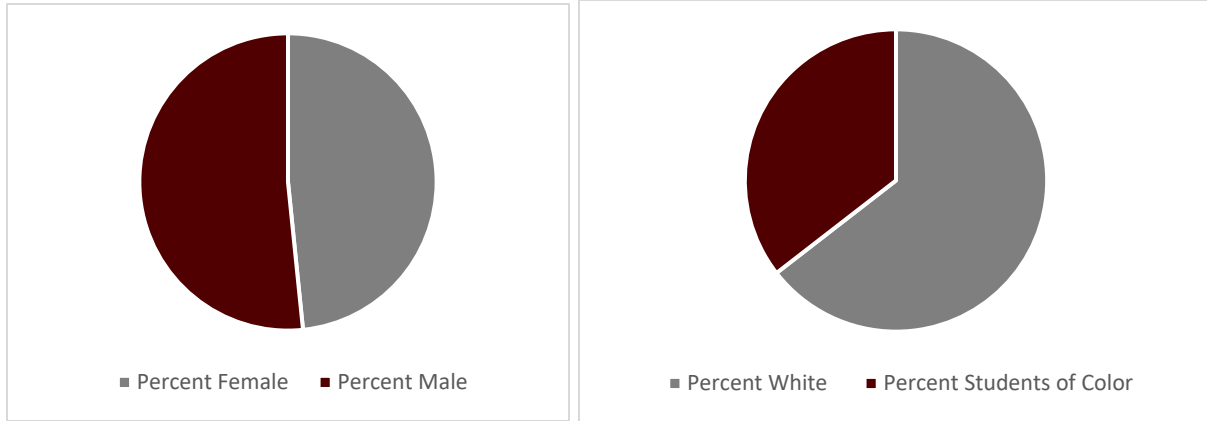


Fig. 3. 2019 cohort student demographics.

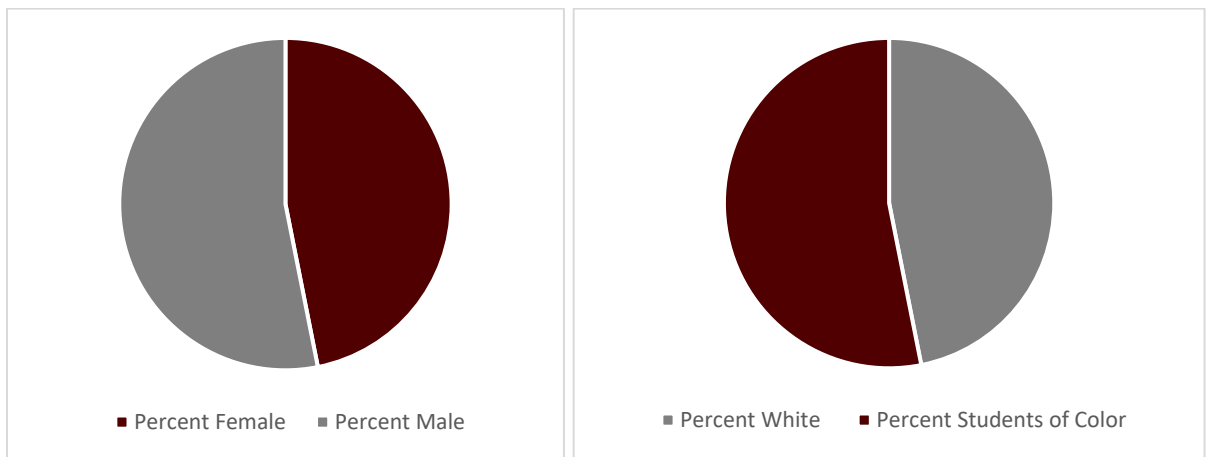


Fig. 4. 2020 cohort student demographics.

**xi. Data**

Data was collected to assess program quality and learning impact. To assess program quality and gather feedback to improve the program from the student’s point of view, Dr. Quadrifoglio developed and implemented a post-program survey made available to students via Google Form after the program. To assess program impact on students’ learning, we gathered pre-program and post-program student grade point averages (GPA) by cohort (not individual students).

Student grade point averages were tracked from the semester pre-program to the semesters post-program (see Figure 1). The 2019 cohort’s GPA increased .08 points in the semester during the global program and rose steadily each subsequent semester, with a final increase of .15 points three semesters after the global program. Although the change from pre-program to spring 2019 was not significant, there was a steady rise in GPA through spring 2020. While statistical analysis conducted did not find any statistically significant differences in GPA between semesters, both cohorts increased from pre- to post-program, and from during to post-program.

The figures below display the students’ GPA pre-program (in red), during the program (in gray), and post-program (in maroon) for both cohorts.

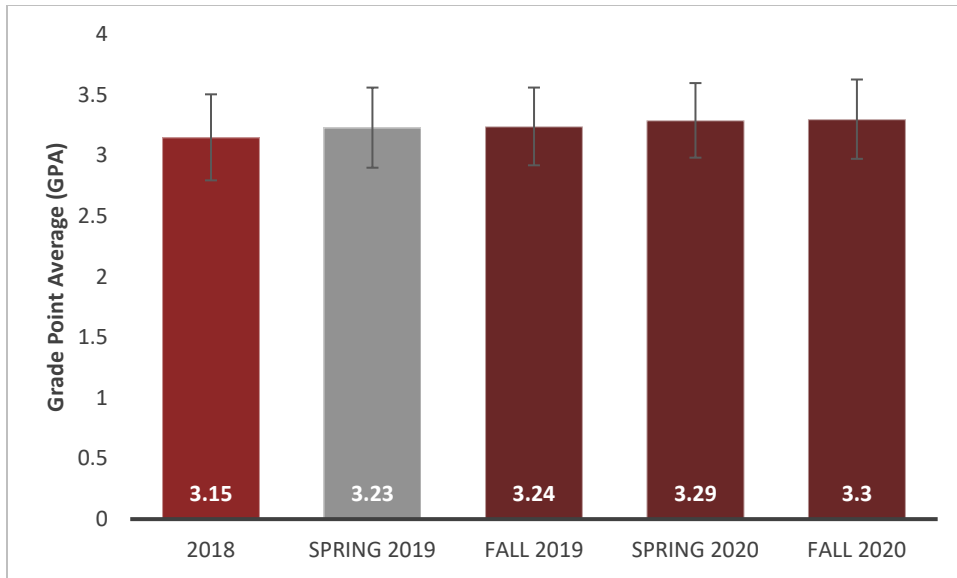


Fig. 5. 2019 cohort grade point average (GPA) pre- and post-program.

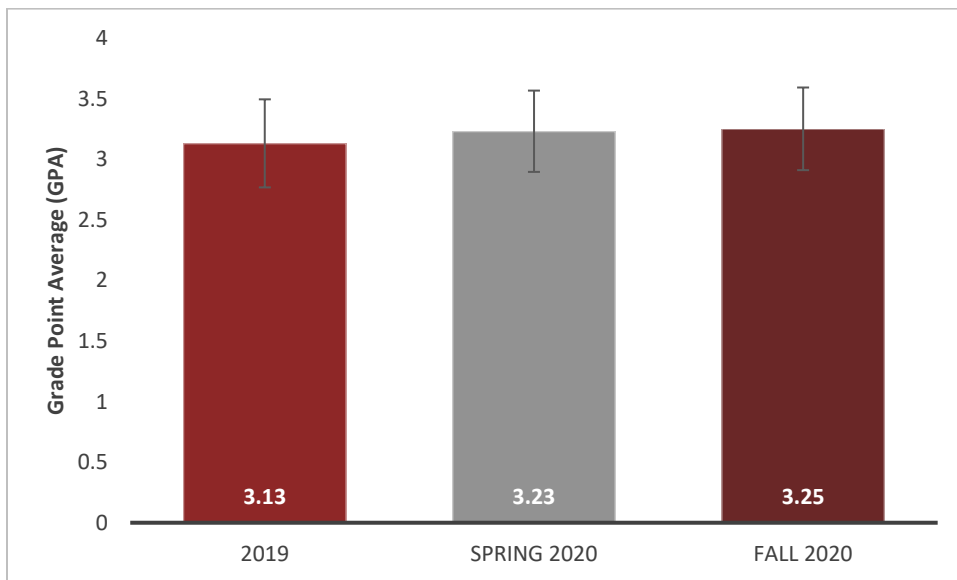


Fig. 6. 2020 cohort grade point average (GPA) pre- and post-program.

The students' opinions of the CVEN Rome Program were captured via a post-program survey. Students were given access to a Google Form after completion of the program. To reduce bias, student anonymity was granted. Questions were designed on a five-level Likert scale from 1 (strongly disagree) to 5 (strongly agree); students were also presented with an option to provide general commentary. Questions, average score (AVG), and most frequent score (Mode) are provided in Figure 2.

	AVG	MODE
The cost of the program (\$7,900) was reasonable.	4.4	5
The transportation in the host country was adequate.	4.3	5
Housing in the host country was adequate.	4.8	5
I felt safe while on the program.	4.9	5
The program's schedule was appropriate.	4.8	5
Classes were comparable to (or better than) classes at TAMU.	4.4	5
Field trips were enjoyable and well-organized.	4.9	5
Field trips were related to my coursework.	4.5	5
I gained in self-confidence because of the program.	4.7	5
I grew culturally because of this program.	4.9	5
The program exceeded my expectations.	4.9	5
I would recommend this program to others.	4.9	5

Fig. 5. Survey questions and average and mode scores.

The most common response to all questions was “strongly agree”, yielding a positive response to every question asked. Average scores range from 4.3 to 4.9, indicating general satisfaction with the CVEN Rome Program. Free-response questions were also included to obtain constructive feedback about all aspects of the program (e.g., best/most challenging aspect of trip). The most common theme in response to “the best part of the study abroad experience” was the cultural and technical visits, and the cultural value obtained through the interactions on the side trips. Some student comments related to the visits include “We explored places I never would have gone to on my free time;” “The technical visits were very informative and helped me understand how all of these things related to studying in Rome;” and “I know that my outlook on life will forever be changed and that I will carry this desire to continue to learn about people, places, and my passions!”. The three equally common themes encountered for the question “the most challenging part of the study abroad experience was...” were 1) the language barrier; 2) homesickness; and 3) transportation in Italy. The responses to “if I could speak to next year’s students going on this program, I would give them the following advice” reiterated the issues experienced with the language barrier, as “learn basic Italian” was the most frequent advice provided. Student comments related to the challenges experiences are “The language barrier is a real thing, but the best advice I have is to just try! People will appreciate you wanting to speak their language” and “Take courses in Italian before coming”.

Some general comments include “The best part of this semester was being completely immersed in a culture and language that was entirely different from one I grew up in;” “You grow so much as a person, you push yourself out of your comfort zone, and you learn so many skills that will help you in the long run during your career;” and “I’m extremely thankful for this program and for the lifelong memories and impact it has left me with. I know I will be a better student, friend, employee, and person because of this experience”.

The CVEN Rome Program appears to benefit students, as manifested via a slight increase in GPA. An increase in GPA indicates classes following the program did not suffer from lack of base knowledge that would have been obtained on the trip. When asked about their experience, students provided highly enthusiastic responses with positive agreement to every Likert scale question asked. CVEN Rome Program critiques were country-specific (e.g. transportation);

however, the persistent responses about the language barrier indicate an area in which the CVEN Rome Program may find room for improvement.

## **xii. Student Impact**

One academic concern raised often with a study abroad program is whether or not students learn the content they need to succeed academically as they return from the experience. During a study abroad program, there are several competing priorities with learning the culture, traveling, and taking advantage of this unique experience. The CVEN Rome Program was designed to maintain the same rigorous curriculum of courses taught in College Station, while providing some schedule flexibility to allow students to travel and learn from this unique environment. Based on the pre- and post-program student GPA, it was concluded that the program, as it was built, did provide students with the technical knowledge they needed for the classes for that semester and the subsequent semesters upon their return from Italy. As shown above, students' GPA improved on the subsequent semesters of the program. This, even though not measured, could have attributed to their increased confidence and maturity developed during the program, which was informally reported by students. In addition, upper-level classes students enroll in after the semester in Rome include projects and group work. We strongly believe that the technical visits and students' ability to collaborate with people who possess different ideas highly contribute to these students' success in group project-based courses. Students also reported to have built good time management skills and a support group, which continued after they returned from the program.

Moreover, particular attention was placed on the social aspect of the CVEN Rome Program to prevent isolation, mitigate homesickness, and create a living learning community to support the academic aspect of the program. Students were provided sufficient freedom to explore and travel independently (if they chose to do so). Students initiated the creation of small groups to travel and explore Europe according to their interests. This independent traveling supports confidence development, planning, as well as their problem-solving ability. Frequent social group activities were built into the CVEN Rome Program to prevent isolation and homesickness, and to build a supporting community.

## **xiii. Other Impact**

### *Recruitment Potential*

Hiring local teaching assistants for the CVEN Rome Program is a direct way to recruit students for our graduate programs at Texas A&M and students' exchange. Interest and ties were already building up, but stopped by the current COVID pandemic. Also, the success and awareness of the program is a potentially extraordinary magnet for prospective applicants to the Texas A&M undergraduate engineering programs, boosting future enrollment.

### *Research Opportunities*

The CVEN Rome Program helped strengthen research collaboration among institutions. Dr. Quadrifoglio already had solid ties with the faculty at Rome Tre, built during his Faculty Developmental Leave and Fulbright Award periods, resulting in joint proposals and papers among the institutions.

### *Faculty Opportunities*

The CVEN Rome Program also potentially allows our Texas A&M faculty to teach classes in Rome on occasion; for example: while in FDL or other approved leaves/arrangements or to build research ties with local faculty and/or collect data (earthquake, structures, transportation, construction, water resources, etc.) for their own research. This opportunity might be very well facilitated by a modular organization of the program's classes. The potential participation of other Texas A&M faculty would also reduce the need/cost for the adjunct faculty.

### **xiv. Conclusion**

After analyzing student responses and considering all aspects of the CVEN Rome Program, the following key elements and lessons learned were established to guide others who may wish to replicate the CVEN Rome Program as well as for ourselves on this continued journey of program improvement.

### *Key Elements*

The components that strengthened this program can be summarized as follows:

- A strong partnership between the universities and their faculty enabled effective collaboration and continual communication, making problem-solving and student management swift and productive.
- Solid infrastructure through local knowledge or a reputable provider removes issues one may experience due to a language barrier or lack of cultural knowledge.
- A necessary key to success is selecting a proper class variety to maximize students' eligibility to apply. Classes offered abroad should be as many as possible to maximize the supply, but of course, each class has a cost and is bound by the availability of the instructor(s). An ideal compromise is 4-5 classes, to allow willing and fully eligible students to complete a full Spring semester of face-to-face learning abroad. At the same time, some of the interested students might not be attracted to all classes, so it is imperative to broaden the supply with available online courses. This would greatly increase the eligibility, interest, and applications to the program from multiple engineering departments.
- A minimum enrollment of two on-site classes is deemed appropriate to be enforced to prevent students to register (almost) exclusively for online classes and be virtually isolated and excluded from any academic program activities.
- Program cost: Keeping the cost as low as possible is paramount. Aligning costs as closely as possible to a semester at the home country is crucial in developing a program that is accessible to all. This not only supports our recruiting efforts, but also our inclusiveness effort to provide a global experience to a large number of students and not make it an elite program. An effort to wisely choose valuable activities at reasonable costs and leverage on expertise and partnership is crucial in keeping cost down and student interest high.

### *Lessons Learned*

The lessons learned from the deployment of the first two years of this program can be summarized as follows:

- Student cohort-centric view: Defining the cohort to be served by the program and ensuring there are enough students in the cohort to reach eligible students is key to reach a minimum number of students to make the program viable and sustainable.
- Home faculty engagement: Faculty from the program university (Texas A&M) willing to lead and supervise the program and to work a full long semester abroad is necessary to maintain the program running smoothly.

Considering the improved student GPA on subsequent semesters, the post-program student evaluation, and the sustained 2-year enrollment of above 30 students, the CVEN Rome Program has proven to be successful. The interest and participation from a large number of students from many departments went beyond our expectations. According to post-program surveys and interviews, students found the CVEN Rome Program enjoyable and rewarding; in particular, long-lasting friendships and bonds were created among participants. Overall, participant satisfaction with the CVEN Rome Program is high, and the faculty's continued participation is a positive indicator that the program is fulfilling. Student grades do not suffer after having completed in the program; GPA evidence demonstrates that students are still learning the material necessary to succeed in semesters following the class. In conclusion, it is possible to develop semester-long global programs for engineering students. A careful selection of course variety, institutional support, and a strong collaboration among the participating institutions made it possible.

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