

# ENGINEERING ROME



A University of Washington Study Abroad Exploration Seminar

Program directors:

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## Program Information

<b>Location:</b>	Rome, Italy and Seattle, Washington
<b>Department:</b>	Civil and Environmental Engineering
<b>Classroom Dates:</b>	Spring Quarter 2022 (1.5 hrs. per week)
<b>Dates in Rome:</b>	26 August – 20 September 2022
<b>Estimated Program Fee:</b>	\$5,100
<b>Course</b>	CEE 409/509 Engineering Rome
<b>Credits:</b>	5
<b>Program Director:</b>	Steve Muench, Professor Civil and Environmental Engineering
<b>Application Deadline:</b>	15 February 2022
<b>Information Sessions:</b>	To be scheduled

## About the Program

Engineering Rome is a UW Exploration Seminar that covers Roman and Italian engineering over a range of 3,000 years from Ancient Rome to the present day. It consists of one 5-credit course, CEE 409/509 Engineering Rome, which takes place in Rome, Italy at the UW Rome Center for three weeks during the Summer-Fall quarter break. There is also a once-per-week orientation session that meets the preceding spring quarter.

## Program Content

This program explores over 3,000 years of cutting-edge engineering in the heart of Rome. It provides engineering students and those interested in engineering a unique international and historical perspective on engineering practice and its contributions to society. Rome is one of the richest sites in the world for exploring engineering through the ages from ancient Roman aqueducts, to Baroque basilicas, to sustainable life in a massive modern city. Students will interact with local experts on Roman cities, archeology, construction, infrastructure and sustainability. Students will develop skills that allow them to analyze and evaluate civil infrastructure of all ages. Skills will be put to practice with classroom engineering analysis, expert lectures, and site visits guided by Roman experts in the engineering aspects of these sites (both modern and ancient).

## UW Catalog Description: CEE 409/509 Engineering Rome

Engineering-focused Exploration Seminar that covers Roman civil engineering over 3,000 years from Ancient Rome to the present day. Introduction to civil engineering topics reinforced by practical engineering calculations, local experts and site visits. Provides international and historical perspective on engineering and the contributions of engineers to infrastructure and society.



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## Who Can Take the Class

**Anyone enrolled at the University of Washington.** The class is open to all undergraduate and graduate students. You do not need to be a Civil and Environmental Engineering major, or even an Engineering major. You just need an interest in the subject. Keep in mind that we will be doing engineering analysis in the class so that type of activity should be something you are okay with doing and able to do. If you have had math education up to, but not including, calculus you should be just fine.

**Why the 409 and 509 course numbers?** Any course in the UW that graduate students can regularly take is supposed to have a separate 500-level course number for graduate students to use. If you are an undergraduate, you will use the CEE 409 number. If you are a graduate student, you will use the CEE 509 number. Graduate students will be held to a higher standard on the final project but other than that the course is identical.

## What About COVID-19 and related issues?

We are aware of the uncertainty and potential limitations associated with COVID-19. We are proceeding forward with Engineering Rome 2022 for an on-time start in Rome, Italy on 26 August 2022. We realize that the health and safety situation can be fluid and may change. If it does, we will keep students current with our best information, and make changes or even postponement if warranted. We endeavor to keep everyone updated on program news weekly from acceptance into the program until arrival in Rome, Italy. Any necessary modifications will be communicated as soon as we are aware. We do not anticipate changing the date of Engineering Rome within 2022. In sum, we plan on going, and will make the necessary adjustments and decisions as they arise. UW Study abroad bills a small fee in advance of the course, with the entire course fee billed only after the course is complete. Any fee charged beforehand for a course that is cancelled will be fully refunded to you. You will not be charged for the course until after you complete it.

## More information

**Information sessions:** Stay tuned. Follow on Facebook for notification of sessions.

**Course website:** [www.engineeringrome.org](http://www.engineeringrome.org)

**Facebook:** <http://www.facebook.com/engineeringrome>

**E-mail:** ask Professor Steve Muench at: [stmuench@uw.edu](mailto:stmuench@uw.edu)

## Signing up for Engineering Rome

Once the UW Study Abroad program approves the 2022 slate of Exploration Seminars (likely towards the end of 2021) you will be directed to sign up through the [UW Study Abroad website](#). Keep in mind that until this slate of courses is approved, UW Study Abroad will not have information on Engineering Rome. If you want to keep up to date and informed, like us on Facebook.

## Course Learning Objectives

Upon successful completion of this course, the student will be able to:

- Communicate engineering ideas in a clear, concise and effective format both in oral presentation and written report.
- Exercise critical thinking by making engineering judgment decisions based on real-world information that is often inconsistent or incomplete.
- Discuss the major civil infrastructure of Rome including how it was built and the engineering principles governing its function to include, masonry arches, water supply, sewers, foundations, passive solar, roads, urban development, and sustainability.
- Explain and analyze the function of select civil infrastructure using engineering principles, equations, and technical description. To include masonry arches, aqueducts, pavements, passive solar, and sustainability.
- Write the equivalent of a 10-20 page paper in an online Wiki format to include photos, videos, maps, a literature review, personal observations and conclusions.

## More Program Information

### Rome on your own and socializing

There will be ample time for students to explore Rome and its engineering on their own. This serves as independent study and contributes substantially to your experience and the final project. There will also be scheduled social gatherings including class dinners, an Italian class, a cooking class, a bike along Via Appia Antica, and a soccer game at Stadio Olimpico. We will also try to interact with the other UW students studying at the Rome Center while we are there.

### The UW Rome Center (<https://www.washington.edu/rome>)

The UW operates its own center right in the middle of Rome! Located in Palazzo Pio, the Rome Center provides a unique scholarly work place in Rome's historic center, offering outstanding facilities for academic programs. This will serve as our classroom and focal point for our time in Rome.

### 2022 Rough Schedule (Subject to Change)

The schedule is not yet final. I provide schedules from the last course as examples.

**Orientation Seminar: Spring Quarter 2022**

Class meets once per week. The schedule is not yet final, but will look something like the table below. The object is to get to know one another, set expectations, and learn a bit about Rome in the process.

<b>Date</b>	<b>Topic</b>
Week 1	No meeting (get familiar with your other classes)
Week 2	General introduction and questions
Week 3	International Programs Office
Week 4	Setting Expectations
Week 5	About Rome
Week 6	Roman Engineering History
Week 7	Course and travel expectations
Week 8	How to use Wordpress
Week 9	Roman History/Culture
Week 10	No meeting (do well on finals)

**Early Fall 2022 (in Rome):** not yet determined. I have included our schedule from 2019 as an example.

## DETAILED SCHEDULE

Upda 26-Jul-2019

	Date	Day	Type	Event	Leader	Location	Time	RS Class?
Prior	22-Aug-2019	Thursday		Steve arrives		Fiumicino Airport		
	XX-Aug-2019			Elyse arrives		Fiumicino Airport		
				Instructor meeting	Steve, Elyse	Ristorante		
Week 1	26-Aug-2019	Monday	Dinner	Student check-in @ Rome Center Restaurant picked by Laura	Rome Center Steve Muench	Rome Center Meet at Rome Center	All Day 19:00-21:00	
	27-Aug-2019	Tuesday	Class	Rome orientation/photo release	RC Director	Rome Center	10:00-11:00	Classroom
			Class	Italian Class	Federica Bianchi	Rome Center	11:00-13:00	Classroom
			Class	Reflections/Project orientation	Elyse Lewis	Rome Center	13:00-13:30	Classroom
			Class	Structures and Materials	Steve Muench	Rome Center	13:30-15:30	Classroom
			Dinner	Group Dinner - Street Pasta	Steve Muench	Meet at Rome Center	19:00-21:00	
	28-Aug-2019	Wednesday	Class	Italian lesson	Federica Bianchi	Rome Center	9:00-11:00	Classroom
			Class	Traffic in Rome/Venice	Elyse Lewis	Rome Center	11:00-11:45	Classroom
			Class	Roman Arches & Construction	Steve Muench	Rome Center	13:00-15:00	Classroom
			On-Site	Colosseum Tour	Steve Muench	Meet at Rome Center	16:30-18:30	
	29-Aug-2019	Thursday	Class	Italian lesson	Federica Bianchi	Rome Center	9:00-11:00	Classroom
			Class	Sustainable Roma	Tom Rankin	Rome Center	14:00-16:00	Classroom
			On-site	Roman Neighborhoods	Tom Rankin	Roma	16:00-18:00	
			Fataly	Dinner at Fataly	Steve Muench	Fataly	18:00-20:00	
30-Aug-2019	Friday	Class	Reflections	Elyse Lewis	Rome Center	11:00-11:30	Classroom	
		Class	Water	Steve Muench	Rome Center	13:00-15:00	Classroom	
		Class	Roman Construction	Steve Muench	Rome Center	15:00-16:00	Classroom	
		On-site	Baths of Caracalla	Steve Muench	Baths of Caracalla	16:30-19:00		
31-Aug-2019	Saturday	Optional	AS Roma/Lazio vs. ????	Steve Muench	Stadio Olimpico			
Week 2	1-Sep-2019	Sunday	Optional	Via Appia Antica	Steve Muench	Via Appia Antica	Uesure	
	2-Sep-2019	Monday	On-site	Parco Acquedotti Fountain Tour	Steve Muench	Parco Acquedotti Meet at Rome Center	14:00-18:00	Uesure
			On-site	Venezia - Transit	Steve Muench	Meet at Rome Center	9:50 depart	
	3-Sep-2019	Tuesday	Dinner	Group Dinner - in Venezia	Steve Muench	Meet at Hotel	19:00-21:00	
	4-Sep-2019	Wednesday	On-site	Venezia - MOSE	MOSE visitor center	Meet at Hotel	10:00-12:00	
	5-Sep-2019	Thursday	On-site	Venezia walking tour	Urban Safari?	Meet at Hotel	10:00-13:00	
			On-site	Venezia - Return		Meet at Venezia S. Lucia	16:25 depart	
	6-Sep-2019	Friday	Class	Underground Rome	Roma Sotterranea	Rome Center	14:00-15:30	Classroom
On-site			San Clemente tour	Roma Sotterranea	Meet at Rome Center	16:30-18:00		
7-Sep-2019	Saturday	On-site	Antichi Acquedotti di Vicovaro	Roma Sotterranea	Meet at Rome Center	8:00-16:00		
Week 3	8-Sep-2019	Sunday						
	9-Sep-2019	Monday						
	10-Sep-2019	Tuesday	Class	Ostia Antica	Tom Rankin	Porta San Paolo	9:00-14:00	
	11-Sep-2019	Wednesday	On-site	Monteverde/S.P. catacombs	Roma Sotterranea	Be at Church	10:00-14:00	
			Dinner	Da Pancrazio (with RS)	Steve Muench	Meet at Rome Center	19:30	
	12-Sep-2019	Thursday	On-site	Metro Linea C TBM	Roma Metro	Get to Porta S. Giovanni	10:00	
			On-site	Cooking Class	Andrea Consoli	Meet at Rome Center	18:00-20:00	
13-Sep-2019	Friday	On-Site	Pacifici Cava / Villa D'Este	Steve Muench	Meet at Rome Center	9:00		
14-Sep-2019	Saturday							
15-Sep-2019	Sunday							
Week 4	16-Sep-2019	Monday						
	17-Sep-2019	Tuesday		Final Exam, Evaluations, Reflection	Steve Muench	Rome Center	15:00-16:00	Classroom
			Dinner	Final Dinner - Trattoria Moderna	Steve Muench	Roma	19:00-22:00	
18-Sep-2019	Wednesday		Student check-out Steve and Elyse leave	Rome Center	Rome Center Fiumicino Airport	6:00		



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## Instructors/Contacts

### **Program Director**

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### **Program Assistant**

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### **UW Rome Center Resident Director**

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<https://www.washington.edu/rome>

## Featured Reading

- Berechman, J. (2003). Transportation – economic aspects of Roman highway development: the case of Via Appia. *Transportation Research Part A*, 37, pp. 453-478. Excellent overview of road construction, reasons for construction, estimated costs, and economic benefits of roads.
- Jones, M.W. (2000). Genesis and Mimesis: The Design of the Arch of Constantine in Rome. *Journal of the Society of Architectural Historians*, 59(1). pp. 50-77. How was this arch designed – presents a “most likely” scenario. Also provides dimensions for this arch and Titus arch.
- Jones, M.W. (2009). The Pantheon and the Phasing of its Construction. Gerd Graßhoff and Michael Heinzelmann and Markus Wäfler, eds. *The Pantheon in Rome*. Contributions to the Conference Bern, November 9-12, 2006, Bern: Bern Studies. Available from *The Bern Digital Pantheon Project*. <http://www.digitalpantheon.ch>. Timing of the Pantheon construction including the buttress structure to the south.
- Lancaster, Lynn C. (2009). Materials and Construction of the Pantheon in Relation to the Developments in Vaulting in Antiquity. Gerd Graßhoff and Michael Heinzelmann and Markus Wäfler, eds. *The Pantheon in Rome*. Contributions to the Conference Bern, November 9-12, 2006, Bern: Bern Studies. Available from *The Bern Digital Pantheon Project*. <http://www.digitalpantheon.ch>. Best discussion of purpose and techniques of relieving arches.
- Macaulay, D. (1974). *City; a story of Roman planning and construction*. Houghton Mifflin Company, Boston, MA. Quick read with bunches of illustrations. Does well to introduce Roman technology and what was contained in a typical city, how it was built, and how it functioned.
- Macchi, G. (2001). Diagnosis of the façade of St. Peter’s Basilica in Rome. *Historical Constructions*, P.B. Lourenco and P. Roca (Eds.), Guimaraes.
- Ring, J.W. (1996). Windows, Baths, and Solar Energy in the Roman Empire. *American Journal of Archaeology*, 100(4), pp. 717-724. You can heat a tepidarium with sun alone.
- Wilson, A. (2006). The Economic Impact of Technological Advances in the Roman Construction Industry. *Innovazione tecnica e progresso economico*.

## Other Reading

- Adams, J.P. (1994). *Roman Building: Materials and Techniques*. Mathews, A. (translation). Routledge, Oxon, UK. Most detailed descriptions about materials and techniques such as mining, wall building, masonry, arches, vaults, etc. Many drawings and B&W pictures. Great descriptions. Few, if any, calculations.
- Adembri, B. (2000). *Hadrian’s Villa*. Mondadori Electa S.p.A., Milano, Italia. Mostly a tour guide.
- Aicher, P.J. (1995). *Guide to the Aqueducts of Ancient Rome*. Bolchazy-Carducci Publishers, Inc., Wauconda, IL. An excellent tour guide of what you can see today around Rome with precise directions. Also has informative maps and histories.



- Albuerne, A. and Williams, M. (20XX). The Deformation of the Barrel Vaults of the Basilica of Maxentius. *35<sup>th</sup> Annual Symposium of IABSE / 52<sup>nd</sup> Annual Symposium of IASS / 6<sup>th</sup> International Conference on Space Structures*, London, September 2011. Shows how vaults have deformed from construction and over time under loads.
- Albuerne, A.; Williams, M. and DeLaine, J. (2012). *On the As-Built Geometry of the Vaults of the Basilica of Maxentius*. In press somewhere.
- Aldrete, G.S. (2004). *Daily Life in the Roman City: Rome, Pompeii, and Ostia*. University of Oklahoma Press, Norman, OK. Great survey of life in ancient Rome. There is a chapter on infrastructure and specific chapters on Ostia, Pompeii.
- Barisi, I. (2004). *Guide to Villa d'Este*. De Luca Editori d'Arte, Roma, Italia. Good section on the hydraulics of the place.
- Betts, R.J. (1993). Structural Innovation and Structural Design in Renaissance Architecture. *Journal of the Society of Architectural Historians*, 52(1), pp. 5-25. Good review of basic church design in the renaissance.
- Blackman, D.R. (1978). The volume of Water Delivered by the Four Great Aqueducts of Rome. *Papers of the British School at Rome*, 46, pp. 52-72.
- Blackman, D.R. (1979). The Length of the Four Great Aqueducts of Rome. *Papers of the British School at Rome*, 47, pp. 12-18.
- Boothby, T.E. (2001). Analysis of masonry arches and vaults. *Progress in Structural Engineering and Materials*, 3(3), pp. 246-256. How to analyze an arch in detail.
- Boothby, T.E. and Anderson Jr., A.K. (1995). The Masonry Arch Reconsidered. *Journal of Architectural Engineering*, 1(1), pp. 25-36.
- Chanson, H. (2000). Hydraulics of Roman Aqueducts: Steep Chutes, Cascades, and Dropshafts. *American Journal of Archaeology*, 104(1), pp. 47-52.
- Chanson, H. (2002). Hydraulics of Large Culvert beneath Roman Aqueduct of Nimes. *Journal of Irrigation and Drainage Engineering*, 128(5), 326-330.
- Cicconi, D. (April 2008). Unearthing Rome. *Travel + Leisure*, 38(4), pp. 148-152. Short piece about the Metro C line and building around archeology.
- DeLaine, J. (1997). The Baths of Caracalla in Rome: a study in the design, construction and economics of large-scale building projects in imperial Rome, *Journal of Roman Archeology*, Supplement 25.
- DeLaine, J. (2000). Building the Eternal City: the building industry of imperial Rome, J. Coulston and H. Dodge (eds.) *Ancient Rome: the Archaeology of the Eternal City*. pp. 119-141.
- Frunzio, G.; Monaco, M. and Gesualdo, A. (2001). 3D F.E.M. analysis of a Roman arch bridge. *Historical Constructions*, P.B. Lourenco, P. Roca (Eds.), Guimaraes.
- Gallieo, S. (2000). *Guide to the Excavations of Ostia Antica with a section about the Renaissance Borgo*. Ats Italia Editrice srl, Roma, Italia. Good detail describing the site.

- Gest, A.P. (1963). Engineering. In: *Our debt to Greece and Rome*, G.D. Hadzsits and D.M. Robinson, eds. Cooper Square Publishers, Inc., New York. Chapters 5 and 6 on aqueducts and roads overview. No technical information.
- Gotti, E.; Oleson, J.P.; Bottalico, L.; Brandon, C.; Cucitore, R. and Hohlfelder, R.L. (2008). A Comparison of the Chemical and Engineering Characteristics of Ancient Roman Hydraulic Concrete with a Modern Reproduction of Vitruvian Hydraulic Concrete. *Archaeometry*, 50(4), pp. 576-590.
- Gowers, E. (1995). The Anatomy of Rome from Capitol to Cloaca *The Journal of Roman Studies.*, 85, pp. 23-32. Non-engineering aspects of the Cloaca Maxima.
- History Channel, The. (2007). *History Channel Presents Rome – Engineering an Empire*. DVD. A&E Home Video. Mostly a superficial story about Rome using infrastructure as the plot line. No actual engineering. Can see much of this in short YouTube segments.
- Hodge, A.T. (2002). *Roman Aqueducts & Water Supply*. Gerald Duckworth & Co., Ltd., London, UK. Incredibly detailed and a bit wordy. Best end-to-end coverage of aqueducts anywhere. Few engineering calculations.
- Jackson, M.D.; Logan, J.M.; Scheetz, B.E.; Deocampo, D.M.; Cawood, C.G.; Marra, F.; Vitti, M. and Ungaro, L. (2009). Assessment of material characteristics of ancient concretes, Grande Aula, Markets of Trajan, Rome. *Journal of Archaeological Science*, 36, pp. 2481-2492.
- Jackson, M.D.; Marra, F.; Hay, R.L.; Cawood, C. and Winkler, E.M. (2005). The Judicious Selection and Preservation of Tuff and Travertine Building Stone in Ancient Rome. *Archaeometry* 47, 3. Pp. 485-510. How and what Romans knew about building materials around Rome. Good maps of soils/materials around Rome.
- Litman, T. (2011). *London Congestion Pricing: Implications for Other Cities*. Victoria Transport Policy Institute, Victoria, B.C.
- Martines, G. (2009). The Structure of the Dome. Gerd Graßhoff and Michael Heinzelmann and Markus Wäfler, eds. *The Pantheon in Rome*. Contributions to the Conference Bern, November 9-12, 2006, Bern: Bern Studies. Available from *The Bern Digital Pantheon Project*. <http://www.digitalpantheon.ch>.
- Moore, D. (1995). *The Roman Pantheon: The Triumph of Concrete*. Self-published by David Moore, Mangilao, Guam. [www.romanconcrete.com](http://www.romanconcrete.com). Excellent source book for Pantheon and concrete/brick making in ancient Rome. More about concrete than Pantheon structure.
- Nardo, D. (2001). *Roman Roads and Aqueducts*. Lucent Books, Inc., San Diego, CA. Basic 9<sup>th</sup>-grade-like text that tells a good story of the aqueducts and roads. A few insights. Quick read.
- Oleson, J.P., ed. (2008). *The Oxford Handbook of Engineering and Technology in the Classical World*. Oxford University Press, Oxford, UK. Huge scope, academically referenced (so you can find other related sources). No calculations. Mostly describes methods.

- Parsons, W.B. (1939). *Engineers and Engineering in the Renaissance*. The MIT Press, Cambridge, MA. Extensive but quite wordy. Really a collection of stories about engineering. Few engineering details, more engineering as subject. Does, however, cover the Renaissance.
- Rankin, T. (2012). *Tom Rankin's Still Sustainable city BLOG: Rome*. Weblog. <http://sustainablerome.wordpress.com>. Accessed 13 February 2012.
- Rinne, K.W. (2010). *The Waters of Rome*. Yale University Press, New Haven, CT. Very detailed description of Papal Rome's use, creation, expansion, etc. of water supply. Includes chapter on streets too. Incredibly detailed.
- Roman Roads. (n.d.). In *Wikipedia*. [http://en.wikipedia.org/wiki/Roman\\_roads](http://en.wikipedia.org/wiki/Roman_roads). Accessed 13 February 2012.
- Sabbgioni, C.; Zappia, G.; Riontino, C.; Blanco-Varela, M.T.; Aguilera, J.; Puertas, F.; Van Balen, K. and Toumbakari, E.E. (2001). Atmospheric deterioration of ancient and modern hydraulic mortars. *Atmospheric Environment*, 35, pp. 539-548. How Roman concrete deteriorates over time.
- Science Channel, The. (2005). *What the Ancients Knew: The Romans*. DVD. Superficial treatment of engineering. Some references to civil engineering in Rome.
- Seemungal, M. (17 September 2009). Rome tunnels through ancient relics to build a subway. *Worldfocus*. <http://worldfocus.org/blog/2009/09/17/rome-tunnels-through-ancient-relics-to-build-a-subway/7312>. Accessed 13 February 2012.
- Sprague de Camp, L. (1963). *The Ancient Engineers*. Doubleday & Co., Inc., Garden City, NY. Chapters 6 and 7 are about Romans. General overview. Of minimal value.
- Staccioli, R.A. (2003). *The Roads of the Romans*. The J. Paul Getty Museum, Los Angeles, CA. Good book for color pictures of roads. Detailed discussions about types of roads, building techniques, locations, etc. Great descriptions of bridges, construction techniques, reasons for doing things.
- The Bern Digital Pantheon Project*. Online digital repository of pictures/articles. Topoi cluster of excellence, Berlin, Germany. <http://www.digitalpantheon.ch>. Excellent source of technical detail on the Pantheon.
- Via Appia: The Ancient Roman Road*. (2003). Palombi Editori, Roma, Italia. Shallow, not much information beyond the tourist minimum.
- White, K.D. (1984). *Greek and Roman Technology*. Thames and Hudson Ltd., London, UK. Good general overview of a lot of different aspects of Roman technology. Talks about innovations during Greek and Roman times (e.g., mining, health, pumps, etc.). Chapter on power generation (human, horses, water, etc.). Specific chapter on Civil Engineering.
- Williams, M.S.; Albuerne, A.; Lawson, V. and Yip, F. (2012). Model Scale Shaking Table Tests on Masonry Barrel and Cross Vaults. *15<sup>th</sup> World Conference on Earthquake Engineering*, 24-28 September 2012, Lisboa, Portugal.



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## About Us

Muench, S.T.; Thompson, A.A. and Brandalik, S. (2015). Engineering Rome: Assessing outcomes from a study abroad program designed to overcome barriers to participation. *ASEE Annual Conference and Exposition, Conference Proceedings*, 122<sup>nd</sup> ASEE Annual Conference and Exposition: Making Value for Society. Seattle, WA.

## Assignments (30% of Grade)

### Homework 1: Basic Italian

- Turn in worksheets handed out during instruction

### Homework 2: Masonry Arches

- Determine line of thrust
- Analyze statically determinate arch

### Homework 3: Open channel flow

- Bernoulli equation
- Hydraulic grade line
- Head loss

### Homework 4: Rome Transportation

- Assignment addressing transportation in Rome today

## Photo Journal and Class Participation (20% of grade)

Students will contribute to an online photo journal of the course. Students are also expected to take an active role in class discussions and site visits.

## Final Project: Wiki article (40% of grade)

Each student picks a civil engineering subject that has a relationship to Rome in some manner. Most topics are acceptable after consulting the instructor. Upon approval of the subject by the instructor, the student will assemble a Wiki article that is the equivalent of a 10-20 page report. Each report shall include the following features:

- Literature review
- Personal field observations from in and around Rome (the student is expected to go observe the subject in the field if possible...and take pictures/video)
- Photographs and/or videos taken by the student (minimum 10)
- Map(s) (minimum 1)
- Engineering commentary and/or analysis

## Exams (10% of Grade)

- Final