



CIV E 601 Analytical Methods for Project Management

Fall 2024 - September 03 to December 06

Class time: 1100am -1350pm

Location: MEC 3-1

Instructor:

Vicente A. Gonzalez, PhD, M.CSCE, M.ASCE
(780) 695 1783
vagonzal@ualberta.ca

Office Hours: Thurs 10-11am @ Zoom (To avoid waiting, email in advance to book time slot; also email for appointments in other times or for in-person office visit)

Course Description:

*3 (fi) (either term, 3-0-0) Overview of project management for capital construction projects. Emphasis on analytical methods for project planning and control, based on engineering design, including project breakdown, project network model design, estimating, scheduling, project control, value engineering, and constructability

Course synchronous and asynchronous content delivery schedule:

In case one does not feel well to attend in-person classes, one needs to email TA Kexin (cc instructor) before class. Lectures recorded in Zoom as much as possible will be made accessible. Attend the class in-person; while the Canvas plus the eBook (strongly recommended to purchase if one can afford) will be sufficient to make it up in case one misses a class due to health reasons.

TA Information:

Kexin Liu <kexin10@ualberta.ca>

TA Help Desk: Tues 10-11 am @ Zoom; to avoid waiting, email TA Kexin <kexin10@ualberta.ca> in advance to book time slot. (email for appointments outside help desk hour or in person meeting).

Course Objectives & General Content:

Students have taken fundamental courses on construction management or project management in undergraduate studies (or through professional project management training) in regards to estimating, scheduling and project control.

This course provides updated knowledge and analytical methods to extend basic concepts and analytical techniques in project management while keeping the "analytical" flavor typical of an engineering course.

Requirements on computer tools:

- MS Excel applications at advanced levels.
- Using commonly applied project scheduling tool like MS Project as part of MS Office Suite.
- Introduction to features and functions of professional project management tools (P6); P6 use is not mandatory.
- Introduction to Agile Project Management concepts and principles formalized by PMI; Agile will be considered via term project by student groups.

Learning Outcomes:

By the end of this course, students should be able to:

1. To distinguish balanced vs. unbalanced pricing in project tendering through bid factor analysis
2. To follow industry best practices in performing project breakdown and preparing project network models
3. To apply path-float based critical path method to simplify project scheduling and time cost trade-off analysis
4. To critically apply Earned Value management in project cost control
5. To apply a non-computer approach to resource scheduling by updating project network models
6. To interpret complex precedence relationships on project network models by applying formalized transform schemes
7. To perform risk analysis and simulation analysis for contingency estimating in bidding and path float based project scheduling
8. To critically apply linear scheduling and repetitive scheduling methods
9. To gain teambuilding and project management experiences through conducting a group-based Term Project

Marking Scheme:

Activity	(A)Synchronous	Due/Scheduled	Weight
Assignments Individual		Specified for each assignment	30%
Term Project Presentation (Video Submission)		Nov. 22	10%
Term Project Report		Nov. 29	20%
Midterm Quiz		Oct. 18	10%
Final Exam		Dec. 06	30%

The Faculty recommended grade point average for a 600 level course is 3.3. Instructors have the leeway to deviate from this average and can assign grades based on their own scheme. All grades are approved by the department chair (or delegate). The office of the Dean has final oversight on all grades.

Term Work

All term work solutions will be posted no later than the last day of classes. All term work will be returned to students by the final day of classes, with the exception of major term work due in the last week of classes.

The latter will be returned by the day of the final examination or the last day of the examination period if there is no final examination in the course as per university policy; instructors will make accommodations to return these term work. It is the responsibility of the student to pick up all their term work at the specified time and place. Any unreturned term work, shall be retained and then shredded six months after the deadline for reappraisal and grade appeals. Final examinations will be kept for one year as required by university guidelines and the Government of Alberta's Freedom of Information and Protection of Privacy Act.

Additional Notes

Late submission is generally not allowed by the Canvas system; contact TA in charge if you have special reasons for being late and up to 50% penalty may apply to late submission within 24 hrs of the due time; Zero credit and self-mark after 24 hrs.

Academic Integrity and AI Tool Usage Policy

In this course, our primary focus is to cultivate an equitable, inclusive, and accessible learning community that emphasizes individual critical thinking and problem-solving skills. To ensure a fair and consistent learning experience for all students, the use of advanced AI tools such as ChatGPT or Dall-E 2 is strictly prohibited for all academic (written/coding/creative/etc.) work, assignments, and assessments in this course. Each student is expected to complete all tasks without substantive assistance from others, including AI tools.

Any use of AI tool in your academic work may result in academic penalties and be considered an act of cheating and a violation as outlined in the relevant sections of University of Alberta (November 2022) [Code of Student Behaviour](#).

Calculator Policy

Approved programmable or approved non-programmable calculators are permitted in examinations. Any calculator taken into an examination must have a sticker identifying it as an acceptable programmable calculator (green sticker) or non-programmable calculator (gold sticker). Students can purchase calculators at the University Bookstore with the stickers already affixed. Calculators purchased elsewhere can be brought to the Student Services where the appropriate sticker will be affixed to the calculator.

Text and References (Recommended):

Lu, M. (2020). Construction Planning by Engineer-In-Training: Quantitative Methods and Practical Cases. eBook published by Kendall Hunt, 4050 Westmark Drive, Dubuque, IA 52002.

[Note this is an eBook on Kendall Hunt Publishing Co. (US) eBook platform; purchasing through Kendall Hunt website will give students one full year access to the textbook and eLearning resources at a lower cost than a paperback or hardcover; students can save the PDF version (chapter by chapter) for personal reference. No paperback copy available for purchase or in library; it facilitates student learning on this course and you can purchase eBook directly on publisher's website:

<https://he.kendallhunt.com/product/construction-planning-engineer-training-quantitative-methods-and-practical-cases>]

T. Hegazy (2001) Computer-Based Construction Project Management, Prentice Hall, Upper Saddle River, New Jersey, 2002 (ISBN-13: 9780130888594).

Website:

Canvas

Previous Examples of Evaluative Materials:

To facilitate learning, Quiz questions (T/F; MC) are found at the end of each chapter in the eBook; problem solving sample questions (from previous mid-term or final) are similar to eBook quizzes and individual assignments.

Did you know that the University of Alberta has various low-to-no-cost services to help students succeed? Visit <http://www.deanofstudents.ualberta.ca/> for information about the academic, wellness, and various other support services available to U of A students. It's never too early or too late to seek help!

Civ E 601 Fall 2024					Group-based (4 in a group) Project planning
Week ID	Date	Content	Individual Assignment	Relevant Section in eBook	Term Project
1	6-Sep	Course Overview; Estimating basics review			
2	13-Sep	Bid factor extension; estimating in the context of unbalanced pricing (1.1)	A1	1.1: Q2 plus "J. reading"	
3	20-Sep	Scheduling foundation: AON/CPM/Float/Path (1.2); PMBOK Introduction	A2		Introduction to Term Project; Grouping deadline: Sept 20 ; Email any questions to TA Kexin.
4	27-Sep	Project Time-Cost Tradeoff Analysis: Path Float Critical Path Method (1.2)	A3	1.2: Q1	
5	4-Oct	Cost Control: Budget/S Curve/EV (1.3)	A4-1	1.3: Q3 Q4	
6	11-Oct	Forecast "Estimate To Complete" in Earned Value for Project Control (1.3); Factoring productivity in planning labor-intensive project (3.1)	A4-2	Revit Problem Set	
7	18-Oct	Mid-Term Quiz (1h) ; plus 1.5 h lecture on: Resource-constrained scheduling by Resource-Activity Critical-Path Method (3.5)	A5	3.5: Q2	
8	25-Oct	Applying and interpreting smart relationships: Precedence Diagram Method (3.5)	A6	3.5: Q4	Term Project Progress check
9	1-Nov	Risk analysis in cost estimating; Contingency in Bidding; Range estimating simulation (4.1)	A7-1	4.1: Q1 Q2	
10	08-Nov	Risk analysis in project scheduling; Program Evaluation and Review Technique (PERT); PERT Simulation: Path-Float Based Excel Solution. (4.2)	A7-2	4.2: Q1 Q2	
11	15-Nov	Reading Week			
12	22-Nov	Repetitive scheduling methods: Line of balance; Flowline.			Term Project Presentation Video Due: Nov 22
13	29-Nov	Course Summary and Q&A			Term Project Report Due: Nov 29
14	6-Dec	Final Exam			

Assignments individual	30%	Individual
Term project:		
4 students each group; Project Report	20%	Group
Term project presentation: group prepares 10 min PPT video	10%	Group
Mid term Quiz	10%	Individual
Final Exam	30%	Individual

Quizzes: self study chapter by chapter in the eBook; unlimited attempts.

UNIVERSITY AND FACULTY POLICIES

COURSE OUTLINE POLICY

The policy about course outlines can be found in Course Requirements, Evaluation Procedures and Grading of the University Calendar, see <https://calendar.ualberta.ca/>

RESPECT AND PROFESSIONALISM

The Faculty of Engineering is committed to fostering and protecting an equitable, inclusive, and respectful work and study environment in line with University of Alberta policies and professional engineering industry standards. University is an opportunity for students to explore areas of interest and to potentially pursue a career in a specific field. The Faculty of Engineering prepares students to uphold industry standards to become a Professional Engineer (P. Eng). Respect, professionalism, and accountability must be upheld within the Faculty of Engineering.

Harassment and discrimination are serious issues that have a negative effect on culture and therefore the [Student Conduct Policy](#) states that no student shall discriminate against or harass any person or group of persons. The Faculty expects an environment free of harassment, discrimination, and bullying. Please refer to the [Definitions for Discrimination, Accommodation and Harassment](#).

SAFETY DURING LEARNING ACTIVITIES

In all Faculty of Engineering courses, labs, seminars or other learning activities, safety is of paramount importance. In some cases, laboratory work in a program requires high standards for risk management to keep potential hazards safely under control. Anyone found to be unable to function safely, due to intoxication, harassment or discriminatory behaviour, or other reasons, in the class, lab, seminar or other learning activity may be asked to leave or be removed for their and the safety of other participants and instructors in alignment with the Student Code of Behaviour or Student Conduct Policy. As members, or prospective members, of the engineering profession, it is your responsibility to identify and inform the proper authorities of an unsafe work/learning environment.

AUDIO/VIDEO RECORDING

Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Only those items specifically authorized by the instructor may be brought into the exam facility. The use of unauthorized personal listening, communication, recording, photographic and/or computational devices is strictly prohibited. Students should refrain from bringing any unauthorized electronic device into an examination room, including cell phones, high tech watches, high tech glasses or other such devices.



ACADEMIC INTEGRITY

Students at the University of Alberta must follow, in its entirety, the

Code of Student Behavior.

Failure to know the Code is not an acceptable excuse for breaking the Code.

If you have not already done so, make sure you review the Code, which is found here along with other resources:

<https://www.ualberta.ca/natural-applied-sciences/portfolio/education/academic-integrity-and-discipline.html>

Engineering students studying in the province of Alberta should also follow the

Code of Ethics

by The Association of Professional Engineers and Geoscientists of Alberta (APEGA), which is found here: <https://www.apega.ca/members/legal-obligations>

The Code of Student Behavior should not be too hard to follow. Listen to your instructor, be a good person, and do your own work, as this will lead you toward a path to success. Failure to follow the Code can result in a grade of 'F' for the course, a transcript remark, suspension, and even expulsion from the university.

"Integrity is doing the right thing, even when no one is watching"
C.S. Lewis



Engineering at Alberta

NEED HELP?

There are a lot of services available to students on campus and in Edmonton, and sometimes it's hard to know where to go. While this isn't a comprehensive list, the services shown here should at least give you some ideas about where to start. If you're still not sure, check out the services just beneath this box—they'll give you the guidance you're looking for.

DON'T KNOW WHERE TO GO?

Student Service Centre

The U of A's central hub to find the right help for your needs.

uab.ca/ask

24/7

Empower Me (international)

1-833-628-5589

HELP

Edmonton Distress Line

780-482-4357 (HELP)

WELLNESS

Wellness Supports

Free 1:1 support for students in the areas of housing, finances, academics, personal wellness, life skill development, family dynamics, system navigation, and any area of life where there is a desire to invite change.

P: 780-492-1619 | E: wellness@ualberta.ca

M-F, 8:30am-4:30pm (Sep-April), 8:00am-4:00pm (May-Aug)

Counselling and Clinical Services

Free, short-term, appointment-based counselling and psychiatric services. Also offers drop-in workshops. Book an initial consultation.

P: 780-492-5205 | M, R, F, 8:00am-4:00pm; T, W, 8:00am-7:00pm

Interfaith Chaplains' Association

Get guidance, care, and support, whether or not you identify with a particular faith. Make an appointment.

P: 780-492-0339 | E: interfaithchaplains@ualberta.ca

The Landing

Offers drop-in support on matters of gender and sexual diversity.

P: 780-492-4949 | E: thelanding@su.ualberta.ca | M-R, hours vary

Peer Support Centre

Anonymous, confidential help from trained students. By appointment only.

P: 780-492-4268 | E: psc@su.ualberta.ca | M-F, 9:00am-8:00pm

Sexual Assault Centre

Free, anonymous, and confidential drop-in counselling.

P: 780-492-9771 | E: sexualassaultcentre@ualberta.ca

M-F, 9:00am-8:00pm

University Health Centre

An on-campus health clinic that provides medical services to staff, students, and their spouses and children.

P: 780-492-2612 | E: hws@ualberta.ca | M-F, 8:30am-4:00pm

ACADEMIC

Engineering Student Services

Drop-in, first-come, first-served advising.

E: enggadvising@ualberta.ca

Engineering Student Success Centre

Drop-in tutoring for first-year courses.

E: dessc@ualberta.ca

Academic Success Centre

Many services to maximize your academic success. E:

success@ualberta.ca | M-F, 8:30am-4:30pm

Academic Accommodations

Connects students with disabilities to

accommodations. E: arrec@ualberta.ca

M-F, 8:30am-4:30pm

Office of the Student Ombuds

Call for complex problems and conflict mediation.

P: 780-492-4689 | E: ombuds@ualberta.ca

FINANCIAL

Student Service Centre

For awards and other funding supports.

uab.ca/ask

Campus Food Bank

Many food support options available. E:

info@campusfoodbank.com

SOCIAL

Unitea

Arrange a time to socialize with a peer.

E: unitea@ualberta.ca

BearsDen

U of A webpage. Find student groups, local events, and volunteer opportunities.

WORRIED

ABOUT

SOMEONE?

Helping Individuals at Risk (HIAR)

If you're worried about someone because of the things they've been saying or doing, or there's a noticeable change in their behaviour (often in multiple ways), contact HIAR, who will protect your confidentiality and help decide how best to support the person.

780-492-4372

hiarua@ualberta.ca

CONFIDENTIAL SUPPORT

Office of Safe Disclosure and Human Rights

The OSDHR advises confidentially on sensitive issues you may not feel comfortable solving on your own. Contact the OSDHR if you want to get help or to make a report while keeping your privacy.

780-492-7357

osdhr@ualberta.ca