ENGINEERING
McMaster-Mohawk
Bachelor of Technology
Partnership

McMaster University

Course Outline

1. COURSE INFORMATION

Session Offered	Winter 2022	
Course Name	Project Management	
Course Code	GEN TECH 4PM3	
Date(s) and Time(s) of lectures	Fridays during the "Winter 2022" academic term.	
Program Name	Civil Engineering Infrastructure Technology / Software Engineering Technology / Energy Engineering Technologies / Manufacturing Engineering Technology	
Calendar Description	Introduction to best practice in project management including the use of planning, software and people management.	
Instructor(s)	Dr. Nahed Ghbn, PMP	E-Mail: ghbnn@mcmaster.ca Office Hours & Location: The best way to obtain lengthy feedback is to see me at the end of each lecture. If there are questions, I will stay up to an hour after the lecture to respond to questions on a first come, first serve basis. If there a lot of questions, I reserve the right to "triage" them based on my assessment of how urgent and well served by other sources they are.

2. COURSE SPECIFICS

Course Description

Instruction Type

Code	Type	Hours per term
C	Classroom instruction	
L	Laboratory, workshop or fieldwork	
T	Tutorial	
DE	Distance education	39
	Total Hours	

Resources

ISBN	Textbook Title & Edition	Author & Publisher
ISBN: 9781628253825	A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Sixth Edition, Published 2017	Project Management Institute
Support: **ISBN:** 9781628256642	A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Seventh Edition, Published 2021	Project Management Institute
Support: 978-1118022276	Project Management: A Systems Approach to Planning, Scheduling, and Controlling (11th Edition), Published 2013.	Harold Kerzner

	Other Supplies	**Source**	
Prerequisite(s)	None		
Corequisite(s)	None		
Antirequisite(s)	None		
Course Specific Policies	This course will be using a range of software. Students should be aware that when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor. <u>Student Expectations</u> Expectations of the student are broadly defined as follows: 1. Prepare for class, read the course materials before the lectures, attend and participate in classroom discussion. Students accept responsibility for their learning in this blended course by having examined the weekly course materials (reading, introductory video, weekly tutorial materials) in preparation for an online tutorial. The course agenda and assignment schedule have been structured such that each class builds on things learned previously. 2. Group work is required in this course; such collaborative work is mandatory. 3. Complete the two reports of the group assignments, and submit them on time to the Dropbox on A2L. 4. Attend the final presentation. 5. Share practical experience and considerations with the class. This is a course directed at providing practical training to students either already employed in, or soon to be employed in, technical work. As such, much of the learning will come from understanding and contrast the experience of different people in different industries and situations. Please share your experiences with the class when you think these are relevant to illustrating the tools or concepts being discussed. Classroom lectures are meant to guide your readings and assignment work and to tie these into a consolidated package. The bulk of your learning will happen outside the classroom. <u>Attendance/Participation</u> I appreciate that most of you have busy work and family schedules and that sometimes attendance may be a challenge. That having been said, we have packed		

	lecture and assignment plans, so regular attendance is important both to your results and to your contributions in class. In particular: a. The lectures will draw extensively from materials available on Avenue, but I think you will find that the lectures are important to understanding how things hang together, as well as to gaining practical insights from me and other class members. b. We will be going through at least one Worked Example most weeks. These are directly relevant to the marked group assignments and will greatly decrease your effort on these. <u>Class Participation</u> Project management is not physics. It does not consist of independently true "facts" or theory that can be studied and understood independently. At best, it is an "applied science," and more likely it is a framework for organizing experiences of how projects are properly functioning, and some commonly accepted tools and vocabulary for implementing that framework. It means the more real-world experience that can be used to illustrate the concepts involved the better. All assignments must be submitted in two Reports and must be submitted to the Dropbox on Avenue to Learn in a compiled one single file using the following formats: Microsoft Word document (.doc, .docx), or Text PDF (.pdf). Group participation is mandatory. All students must attend and participate in group presentations.
Departmental Policies	Students must maintain a GPA of 3.5/12 to continue in the program. In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of "out-of-class" work for every scheduled hour in class. "Out-of-class" work includes reading, research, assignments and preparation for tests and examinations. Where group work is indicated in the course outline, such collaborative work is mandatory. The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception. Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class. Instructor has the right to submit work to software to identify plagiarism.
3. SUB TOPIC(S)	
Week 1	Course Introduction: • Introductions • Course Outline Review • Course Administration

	Project Management Framework: • The Project as a Process • The Role of Projects within an Organization • The Project Life Cycle • The Project Management Life Cycle • Project Management Constraints Project Selection Methods Project finance and selection: Analysis and concepts (PV, NPV, IRR, Payback, etc.)	
Week 2	Organizational Context • Project environment (internal & external) • Typical enterprise program management organizations: Functional, Matrix, and Projectized organizational structure • PMO formation and roles • Critical Stakeholder roles: project management; functional management; sponsors; project team Project Integration Management: • Develop project charter • Develop a project management plan • Direct and manage project execution • Manage project knowledge • Monitor and control project work • Perform integrated change control Close project phase	
Week 3	Scope and Requirements Management: • Requirements Management • Define Scope • Create WBS • Scope Verification Control Scope	
Week 4	Schedule Management • Time Management: More than "Scheduling." • Define Activity • Activity Sequencing • Activity Duration Estimating • Schedule Development • Schedule Control Schedule Development Software Project	

Week 5	Project Cost Management
	• Types of Costs: Direct vs. Indirect; Overhead; Recurring vs. Non-recurring
	• Cost Estimating
	  ○ Types and Purposes of Estimates
	  ○ Estimating Methods	

	○ The Estimating Process • Cost Budgeting ○ Budget Allocation and concepts: work packages/planning packages, allocated/unallocated budgets, management reserve ○ Cost Baseline ○ Budget, Control Accounts, and Work Authorization • Cost Control ○ Project Cost Accounting and integration within the Enterprise: Cost Accounts, links to enterprise accounting ○ Cost Forecasting: • Cost Control and Reporting: Variance Reporting, Intro to EV analysis Cost Development Software	
Report (1) Assignment	Due in week 6 Submitted via Dropbox on A2L as a SINGLE file	
Week 6	Project Quality Management • Quality Management Introduction • Costs of Quality and the Project Life Cycle • Plan Quality: ○ Assessment of Critical-to-Quality items ○ Designing in Quality: Six Sigma Concepts • Manage Quality/ Quality Assurance: ○ Methods of Assuring Quality: Project Management and Design Reviews, Product Verification and Validation • Control Quality: ○ Measures of project quality Dealing with non-conformances: definition of root cause and corrective action; documentation, conformance and non-conformance	
Week 7	Project Resources Management • Resource Planning • Resource Estimating ○ Resource planning: Responsibilities Allocation Matrix (RAM); Resource Histogram; Org Chart ○ Acquire the Project Team ○ Allocation of functional resources ○ Use of resources • Developing the program team: Forming; Storming; Norming; Performing • Managing the Project Team	

	○ Introduction to team management concepts: team maturity; situational leadership; war room ○ Managing Diversity: functional; ethnic; national • Virtual Teams Team Work Challenges	
Week 8	Project Stakeholder Management • Identify, analyze and manage stakeholders • Plan and control stakeholder management Project Communications Management • Communications Planning ○ Intra-team communications: formats; distribution requirements ○ External communication: Chain of command; communications channels definitions • Typical communications methods (memo's, e-mail, action lists, network directory, Web-enabled communications/shareware) • Team meetings: planning, attendance, agenda/notification, conduct, follow-up (action item lists) • Management reviews: typical management review requirements Program archiving and closure: lessons learned; archiving	
Week 9	Risk Management Processes, Risk Management Plan • Definition of risk: probability x impact; types of risk; expected monetary value • Risk management process: Identification; Assessment; Mitigation Planning; Control • Risk Identification ○ Use of Risk Breakdown Structure for brainstorming and reporting ○ Risk ID tools: SWOT; Fishbone; Decision Tree • Risk Qualitative Analysis ○ Probability/Impact Matrix - use of scoring guides ○ Risk Scoring/Prioritization - Top Risks • Risk Quantitative analysis ○ Risk Assessment Tools • Risk Response Planning ○ Techniques • Implement Risk Responses	

	• Risk Monitoring and Control	

Week 10	Procurement and Contracts Management
	• Role of the program manager in contract and subcontract management
	• Introduction to Contracts: Characteristics; Contract Forms and Purposes; Typical Contract Format
	• Contracts Management
	• Procurement Management
	  ○ The Procurement Process
	  ○ The Make-or-Buy Decision
	• Procurement Planning
	• RFP preparation
	• Subcontract Management Considerations: Selection; Monitoring; Change Control
	Contract Control	

Report (2) Assignment	Due in week 11 Submitted via Dropbox on A2L as a SINGLE file	
Week 11	Program Management Integration: Managing through the Project Life Cycle • Pre-project activities: projects and company strategy; project selection; proposal support • Kicking off the project • Changing roles of the project manager throughout the project • Controlling and monitoring work • Managing project changes: contract changes; baseline changes; technical changes and configuration management • Compliance Matrices • WBS, Responsibilities Allocation Matrix, Cost Account Structure • Quality Development • Risk Management Plan • Controlling and monitoring risk through the life cycle: Technical and Phase Gate reviews Project Management Review: • Project life cycle; the project management organization • 10 main aspects of project management: Scope; Cost; Time; Quality; Risk; Communications; Resource; Contracts/Procurement & Integration • Primary program management controls, plans and deliverables	

	• Change management • Program control and management through the life cycle Project Closure Questions	
Week 12	Project Review and Exam Orientation Project Team Presentations Recorded and Online Presentations for each Group Project	
Week 13	Project Team Presentations Recorded and Online Presentations for each Group Project	

Classes end: Tuesday, April 12th 2022

Final Examination Period: Thursday, April 14 to Friday, April 29

All examinations MUST be written during the scheduled examination period.

Note that this structure represents a plan and is subject to adjustment term by term.
The instructor and the University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.

4. ASSESSMENT OF LEARNING *including dates*		Weight
Assignments		30%
Report (1) Assignment, due on the day of Lecture # 6	15%	
Report (2) Assignment, due on the day of Lecture # 11	15%	
Project Presentation		10%
Class Quizzes		10%
Final examination (tests cumulative knowledge)		50%
	TOTAL	**100%**

Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. Define, discuss and analyze the concepts of project management and related topics.
2. Illustrate the significance of (performance, cost, time and scope) as targets of a project to be accomplished.
3. Apply methods used to manage the eight aspects critical to program implementation: scope; schedule; cost; quality; risk; communications; human resources, contracts/sub-contracts and integration.
4. Analyze and test the characteristics of the project components, project management processes and knowledge areas in creative and organized way.
5. Integrate the different aspects of project management and various forms project organizations into phases of a well-managed project.
6. Learn enhanced communication skills and work as a team, adapt the message to the listener or group, facilitate an open exchange of ideas.
7. Produce typical project management deliverables and tools, (WBS, SOW compliance matrix, GANTT chart, etc.), use project management software.
8. Create project management case studies and share them with the Class.

9. Illustrate the link between the tasks of project management and people's attitude to work, teamwork, conflict handling, problem solving, decision making and sustainable project implementation methods.
10. Apply project management concepts by working on a group project as team leader or active team member.

6. COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.
http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty: The following illustrates only three forms of academic dishonesty:

- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com, please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

COMMUNICATIONS

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests. http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.