KWANTLEN POLYTECHNIC UNIVERSITY
Faculty of Science and Horticulture

Graph Theory and Applications (MATH 4280 S10) Course Presentation: Spring 2026

This course will be offered "In Person".

Contact Info:

Instructor	Dr. Asiyeh Sanaei
E-mail	asiyeh.sanaei@kpu.ca
Office Hours	Mon 12:00–1:50 & Tues 2:00 - 2:50 or email me for appointment
Office	S Fir 348

Lecture Info:

Lecture Times	Tues/Thurs 12:00–1:50
Classroom	S Fir 3412

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(1) COURSE FORMAT: This course will be offered mostly in person. We will meet regularly *face-to-face twice per week on scheduled times*. However, to get a full benefit of the digital components of this course and to access KPU services, students must have the following:

i) An electronic device (such as a desktop computer, laptop, tablet or smart phone),

ii) Reliable Internet access.

(2) Pre-REQUISITE: (a) CPSC 1204 (C); (b) MATH 2410 (C); (c) Either MATH 1152 or 2232 (C); and (d) one of MATH 1115, 2315, 2335, or 2341 (C)

(3) COURSE DESCRIPTION: Graph theory is the study of structures that model relations between objects like people, species, cities, computers, proteins, etc. A graph then refers to a set of objects called vertices and a collection of links called edges that connect pairs of vertices. Recently graph theory has become a subject of high interest as it has growing applications into the other areas of science and technology like biochemistry, computer science, engineering, health, and social sciences. In this course, we will learn the foundations of graph theory, study its classical algorithms, and discover its applications in modeling real life problems. We will learn how sophisticated mathematical problems can be modeled and solved using graph theory and how, for example, GPS system finds the shortest routes between locations using graph theory algorithms. We also learn about random and social networks and their properties and parameters. For example, we will understand why we live in a highly connected small world and what parameters influence our social structures and behaviours

- Terminology, Fundamental Concepts and Applications
- Trees
- Networks including random networks, their analysis and visualization

- Graph theory classical algorithms
- Planar graphs
- Eulerian and Hamiltonian graphs
- Independence, Domination and Matching
- Graph Colouring
- A discussion of open problems in the area throughout the term

(4) TEXTBOOK: The following textbook is recommended for this course; however, the course is designed based on a few different textbooks.

Graph Theory: Modeling, Applications, and Algorithms; Geir Agnarsson & Raymond Greenlaw

This book is out of print, but there are copies available at the library. Also, complete lecture notes will be provided to the students.

(5) COURSE WEBSITE: All lecture-related items including announcements, lectures, assignments/solutions, etc., will appear on the course Moodle page accessible through `courses.kpu.ca`.

(6) EVALUATION SCHEME:

Item	Format	Weight
Assignments	Written; Weekly	19%
Two Tests	Take-home	21.5% each
Final project	Report & presentation	32%
Quizzes	Written	6%

(7) ASSIGNMENTS & TESTS: Weekly assignments will be given and must be submitted on the due date at the start of the class.

Tests: You will be given two take-home tests that are to be submitted by the deadlines. You are allowed to use any textbooks from the library, but no online resources are to be used. Collaboration is not permitted.

Final project and presentation: A few weeks into the semester (ideally early Feb), you will choose a topic, study about it and do the required research, find and solve enough number of examples and find some of the applications. Then you will write a detailed and coherent report which will be posted on moodle for other students use one week before your presentation date. Finally, you will present your project to the class. Presentations will be held during the last few weeks of classes and the class will be quizzed on them.

Quizzes: To make sure the projects are contributing to your learning, a short straightforward quiz will be given at the end of each project presentation.

(8) IMPORTANT DATES:

Early Feb ..... Take Home Test 1
Early Mar ..... Take Home Test 2

Tues, Jan 6 ..... Last day to drop courses (100% refund)
Wed, Jan 7 ..... First day of classes
Tues, Jan 20 ..... Last day to add/drop courses (70% refund)
Early Feb ..... Take Home Test 1
Feb 16–21 ..... Reading Break (no classes)
Early Mar ..... Take Home Test 2
Fri, April 3 ..... Good Friday (no classes)
Mon, Apr 6 ..... Easter Monday (no classes)
Tues, April 14 ..... Last day of classes & withdrawal with W grade
April 16 – 24 ..... Final Exams

(9) GRADES:

A^+: 90-100	A: 85-89	A^-: 80-84	B^+: 76-79	B: 72-75	B^-: 68–71
C^+: 64–67	C: 60–63	C^-: 56–59	D: 50–55	F : < 50	

(10) CLASSROOM POLICIES: Students are expected to check all the announcements made through email or course website regularly, to attend the class meetings, and are responsible for any information and announcements that are made.

(11) INSTRUCTOR POLICY ON MISSED/LATE ASSIGNMENTS: The assignments must be submitted on the due dates. Should an assignment/activity be missed due to illness or other valid reasons, proper doctor's note or documentation must be provided. The next course of action will be decided after consultation with myself.

Late assignments: No late work will be accepted.

Missed tests: No make-up tests will be given as they are take-home. If you miss a test due to lingering illness or other unavoidable circumstances, provided that (1) I am notified before the test and (2) proper documentation is submitted, alternative options can be navigated.

(12) SUPPLEMENTAL RESOURCES & ACCOMMODATION: There are lots of opportunities to get help with this course.

Getting help with your studies: You can always reach me by email or come and see me during the office hours or by appointment. As well, Mathematics Faculty members and tutors are available to assist you at The Learning Center; hours and starting date for tutoring will be announced.

Early Alert System: If deemed necessary, this system may be used by faculty to connect you with services who will work with you (like an academic advisor, a tutor, financial aid, a counsellor, or another faculty member) to find additional resources or supports that may increase your chances of success. See the website here.

Accessibility Services: We are committed to creating a learning environment that meets the needs of all our learners. If you face any barriers or you need any special accommodations, do not hesitate to let us know. Also you may contact KPU Accessibility Services at `access@kpu.ca` or call 604–599–2001. Visit the this page for more info.

Counselling Services: Visit this page for supports available when you need them.

Academic Advising: Visit the link for academic advising (Central advising in year 1 or 2; Science advisor in year 3 or 4; International advising for international students).

Rights and Responsibilities: To learn about your rights and responsibilities; visit here.

(13) ACADEMIC INTEGRITY: Although collaboration in solving assignments is acceptable and encouraged, the copying of assignments is inappropriate and will be considered cheating. Submitting someone else's work as your own, copying on tests, and other forms of cheating will be dealt with under KPU Plagiarism and Cheating; visit the website by clicking here.

For a Moodle course on academic integrity click here.

(14) SUGGESTIONS FOR SUCCESS:

- Attend the lectures. Borrow lecture notes from your peers in case you miss one.
- Start your assignments as soon as they are posted. Check them over once they are marked.
- Keep up with the course material. Review the material after it has been covered in class.
- Dot not hesitate to come to my office during office hours or by appointment to discuss a homework problem or any aspect of the course. If you cannot make my office hours, we can find another time.

(15) KPU POLICIES:

All KPU policies can be found at: `www.kpu.ca/policies`

Policy No. HR15 – Diversity and Inclusiveness

Policy No. ST11 – Attendance and Performance in Semester and Other Term Based Courses

Policy No. ST7 – Student Conduct (Non-Academic)

Policy No ST14 – Services for Students with Disabilities

Policy No. ST2 – Plagiarism and Cheating

(16) KPU Dates and Deadlines: For important information on deadlines for refunds, last day to add or drop a course, withdrawal, etc., visit "Dates and Deadlines" page in the Registration Guide; click here.

Date and deadlines for students is accessible here.

NOTE: This syllabus is subject to change due to uncontrollable or unforeseen circumstances occurring after the writing of this document. Any changes will be discussed in class and through the course Moodle page.