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| Hibernia College Planning Form |
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**Session Planning Form**

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| Tutor name: | Kevin O’Brien | | | |
| Delivery date: |  | | | |
| Module title:   |  | | --- | |  | | Mathematics for Computing | | | |
| Session title: | Introduction to Graph Theory | | **Session no.** | 5 |
| Prepare | | | | |
| Session study content: | Chapter 5 of study guide | | | |
| Essential readings: | This exercise requires a full understanding of material covered in “Functions” (Chapter 5 of Book 1) | | | |
| Study aims and learning outcomes: | The quiz/knowledge check questions should focus on determining how well the students succeeded in achieving the study aims and learning outcomes. | | | |
| In this part of the session, students will study the relevant chapter(s) in the University of London study guide and read the essential readings for the chapter(s). When they have completed this, they will complete the end-of-session quiz to see how well they know the session content.  If there are any further readings, resources or web sites that you feel would be useful to students for studying this session, please add them in the next row. | | | | |
| Additional resources | None | None | | |
| Test yourself | Provide multiple-choice questions that test students on the core session content.  Fill in the quiz template at the end of this document with questions and constructive feedback. | | | |
| Evaluate | | | | |
| In this part of the session, students will engage with tasks and activities that will enable them to evaluate and analyse the session content they have studied.  When developing tasks and activities, think about how you intend for the student to achieve each one – this may be through discussing concepts on a forum, contributing to a wiki , conducting some online research, analysing a case study, studying a video, etc.  Discuss your ideas with the Knowledge Officer who will know the full range of options available and advise on which is most appropriate.  Note: You do not need to provide a task for each of the headings below. The task that you provide will depend on the session content and the workload for the student in that session. Select the most appropriate task(s) based on the session content. | | | | |
| Discuss | ~~Provide a question based on the session content that will generate a discussion on the tutor-moderated forum.~~ | | | |
| Solve | Design a problem-solving exercise or worksheet based on the session content that the students will complete. | | | |
| Research | ~~Ask the student to conduct online research into important areas of the session content such as useful examples or further explanation of the content. The findings could then be shared on a forum/wiki/blog.~~ | | | |
| Assess | | | | |
| Note: The activities in this part of the session will be linked to the synchronous online tutorial and the onsite days. The activities for each session will depend on the scheduling of the tutorials and onsites in the module calendar. These activities will be completed over a number of sessions.  Ideally, the activities in this part of the session should link together and be developed over a number of sessions. | | | | |
| Submit | Prepare an activity/task (for example, answering exam questions) for the students and ask them to submit their responses to the tutor prior to an online tutorial or onsite – this submission could then form the basis of the tutorial/onsite discussion.  The activity/task should be based on the content that they have covered in the sessions prior to the online tutorial or onsite. | | | |
| ***Students attempt end of chapter revision questions from the study guide*** | | | |
| Apply your knowledge | In the online tutorial and onsite day, build on the activity/task that students have prepared and submitted. Students could work together in groups to discuss and solve a problem.  A selection of students should be asked to present their submission in each online tutorial or onsite. This would be a different group of students for each tutorials and onsite so every student gets an opportunity to present. | | | |
| ***Not applicable*** | | | |

## Quiz template

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| Session title: | Functions | | Session no. | 4 |
| Test yourself:  Each session should have a minimum of 20 questions in total.  What content is tested will depend on the chapter(s) content – some parts may require more questions than others to test the student.  These questions will be used to test students' knowledge and help them to recall the academic content of the chapter(s).  Constructive feedback should be provided for each question to reinforce the learning for the session. | | | | |
| Q 1: In any graph, the sum of the degrees of the vertices is an odd integer.  a) True b) False | | Q 2: The length of a path is the number of edges on it.  a) True b) False | | |
| Feedback:  False: the sum of the degrees of the vertices is an even integer. | | Feedback:  False**:** The length of a path is the number of vertices on it. | | |
| Q 3:   The degree sequence of a graph *G* is the sequence formed from the degrees of its vertices, usually arranged in descending order of size.  a) True  b) False | | Q 4: A path is an alternating sequence of vertices and edges of the form  ***v1e1v2e2…..vnen***  a) True  b) False | | |
| Feedback:  True | | Feedback:  False, the sequence must end with a vertex, not an edge. | | |
| Q 5:  The length of a cycle is the number of edges on it.  a) True  b) False | | Q 6:  Is it possible to have a degree sequence 4,4,3,3,2,2  a) Yes  b) No | | |
| Feedback: True | | Feedback: Yes, the sum of the degree sequence is an even number. | | |
| Q7. The following graph is a k-6 graph.    a) True  b) False | | Q8. The following graph is a k-6 complete graph?  a) True b) False | | |
| Feedback: The correct answer is b) False | | Feedback: True | | |
| Q9. Every graph must have an even number of vertices of odd degree  a) True  b) False | | Q 10: by definition a K6 graph is 6-regular.  a) True  b) False | | |
| Feedback: False, this is not a necessary condition | | Feedback: False, it would be 5-regular. | | |
| Q 11: Suppose a graph has the degree sequence  *4,2,2,2*  Is it possible for the graph to be a simple graph?  a) Yes  b) No | | Q12. Suppose a graph G has the following degree sequence  ***4,3,3,3,2,2,1***  How many vertices are there?   1. 6 B) 9 2. 18 D) 12 | | |
| Feedback: No it is not possible to the graph to be a simple graph. | | Feedback: The correct answer is A). There are 6 vertices. | | |
| Q13. Suppose a graph G has the following degree sequence  4,3,3,3,2,2,1  How many edges are there?   1. 6 C)9 2. 12 D) 18 | | Q 14: Question 14:  Suppose a graph has 4 vertices. How many elements (either "0" or "1" ) are in the adjacency matrix   1. 4 C) 64 2. 8 D) 16 | | |
| Feedback: The correct answer is C). There are 9 edges | | Feedback: The correct answer is D) there are 16 (4 rows and 4 columns). | | |
| Q 15: Suppose *r* and *s* are adjacent vertices. We would refer to *r* and *s* as *neighbours* of each other.  a) True  b) False | | Question 16  Which of the following four items is not part of the adjacency list    A) *u: w*  B) *v: w,x*  C) *w: u,x*  D) *x: v,w* | | |
| Feedback: True | | Feedback: The correct answer is C) . These values are not neighbours of *w*.  . | | |
| Q 17: For simple graphs, there is at most one edge between each pair of Vertices   1. TRUE 2. FALSE | | Q 18: For a simple graph: The sum of the degrees of the vertices are equal is the number of edges of G   1. TRUE 2. FALSE | | |
| The correct answer is A) True. | | The correct answer is B) False.  It is twice the number of edges of G | | |
| Q 19: The graph G is said to be connected if each pair of vertices is connected.   1. TRUE 2. FALSE | | Q 20: Which of the following statements is false  Two given graphs are NOT isomorphic if  A) They have a different number of connected components.  B) They have the same number of vertices.  C) They have different degree sequences.  D) They have a different number of paths of any given length. | | |
| The correct answer is A) True. | | Feedback: The correct answer is B | | |