MTH304e Applications of Graph Theory

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JAN

E-Learning: BLENDED - Learning is done MAINLY online using interactive study materials in Canvas. Students receive guidance and support from online instructors via discussion forums and emails. This is supplemented with SOME face-to-face sessions. If the course has an exam component, this will be administered on-campus.

Synopsis:

Graph theory has widely used in many areas such as operational research, computation, chemistry and electronics as graphs are natural models for a variety of situations. This course focuses on some important real-world applications which include the topics of project planning and scheduling, electrical circuit analysis, kinematic design, some geometric design, error-correcting codes and experiment design

Topics:

- Planning and scheduling.
- Knapsack problem.
- Circuit analysis.
- Solving circuit equations.
- Geometric design.
- Incidence structures.
- Kinematic design.
- Planar kinematic systems.
- Error-correcting codes.
- Hamming codes.
- Blocking in experimental design.
- Balanced design and codes.

Textbooks:

Deir Agnarsson, Raymond Greenlaw (2007): Graph Theory: Modeling, Applications, and Algorithms. (eTextbook) Pearson Prentice Hall.
ISBN-13: 9789814648462

Deir Agnarsson, Raymond Greenlaw (2007): Graph Theory: Modeling, Applications, and Algorithms. (eTextbook) Pearson Prentice Hall.
ISBN-13: 9789814648462-AA

Learning Outcome:

- Show how to prove a mathematical statement in graph theory.
- Determine whether a given design is balanced.
- Calculate the vertices, edges, faces of a given polyhedron.
- Demonstrate mathematical reasoning by providing proofs to mathematical statements in graph theory.
- Apply algorithms covered in this course to graph theory problems.
- Compute spanning trees of a given graph.

Assessment Strategies:

Continuous Assessment Component	**Weightage (%)**
PRE-CLASS QUIZ	2
COMPUTER MARKED ASSIGNMENT	8
PRE-CLASS QUIZ	2
COMPUTER MARKED ASSIGNMENT	8
PRE-CLASS QUIZ	2
COMPUTER MARKED ASSIGNMENT	8
Sub-Total	**30**

Examinable Component	**Weightage (%)**
Written Exam	70
Sub-Total	**70**

Weightage Total	**100**