BASIC ENGINEERING DESIGN
Decision Making II

GEN- N1003
Fall 2016
Lecture 7

Dr. Hassan Mostafa
د. حسن مصطفى
hmostafa@uwaterloo.ca

Decision Making
II

Effective Decision Making

- Each day we make decisions. Most decisions are in response to a problem **that faces us**, such as “What should I wear?” or “What sounds good for dinner?” Other decisions can be **more complex** such as “Should I buy a used car or a new car?”

While some people address the issue head on, others may choose to do **one of three things** when faced with a **complex or difficult decision**:

1. They become **uncomfortable or afraid** to address the problem so they **delay** it **.**
2. They look to pass the problem off to **someone else.**
3. They address the problem and perhaps make **a rush decision (Quick decision)** based on incomplete information.

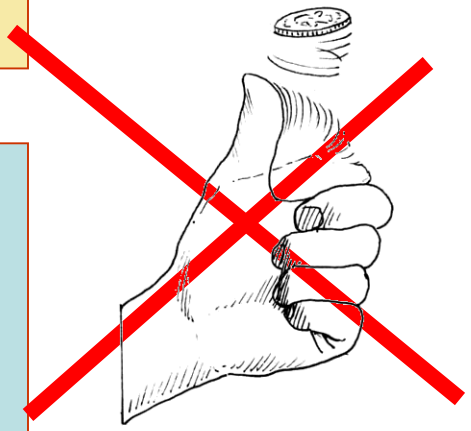
- The goal of an **effective decision making process** is to assist you in becoming more “**conflict competent**” and thus to make **wise and effective** decisions in response to any problem that may arise.

Tips for Effective Decision Making

Use your time for problems that are truly important.

Just because a problem is there doesn't mean that you have to solve it. If you ask, "**What will happen if I don't solve this problem?"** and the answer is "**Not much**," then turn your attention to **something more important**.

Do not make decisions **that are not yours** to make.



Test your assumptions about everything. Check the facts first.

Be sure that you understand the problem and that you have **valid information** to confirm that the **problem is important** - not just hearsay إشاعة**.**

Decision Matrix Definition

A decision matrix allows decision makers to structure, then solve their problem by:

1- specifying and prioritizing their needs **with a list criteria**; then
2- **evaluating, rating, and comparing** the different solutions; and
3- selecting **the best** matching solution**.**

Decision Matrix Activity

Should you be involved in creating a decision matrix, here is the activity you will be engaged in. Use the COWS method, shown below, that describes all the information you should come up with in order to make an impartial decision:

The COWS method

C

Criteria.

Develop a **hierarchy of decision criteria**, also known as decision model.

O

Options.

Identify options, also called **solutions or alternatives.**

W

Weights.

Assign **a weight to each criterion** based on its **importance** in the final decision.

S

Scores.

Rate each option on a ratio scale by assigning it a **score or rating** against each criterion**.**

Decision Matrix

A decision matrix is used to describe a **Multi-Criteria Decision Analysis** (MCDA) problem. If in an MCDA problem, there are **M alternative options** and each need to be assessed on **N criteria**, then the decision matrix for the problem has M rows and N columns, or **M × N elements**, as shown in the following table.

Example

Each element, such as Xij, is either a **single numerical value** or a **single grade,** representing the performance of Alternative i on Criterion j. For example, if Alternative i is "**Car i",** Criterion j is "**Engine Quality"** assessed by **five grades {Excellent, Good, Average, Below Average, Poor}**, and "Car i" is assessed to be "Good" on "Engine Quality", then Xij = "Good".

Decision Matrix Example 1

	Criterion 1		Criterion 2		Criterion ----		Criterion N		TOTAL SCORE
	weight	10	weight	20	weight	5	weight	15	50
Alternative 1	x11		x12		----		x1N		
Alternative 2	x21		x22		----		x2N		
Alternative ----	X--		X--		Xij=good		X--		
Alternative M	xM1		xM2		----		xMN		

Beat Problem

- One random student should formulate a problem to form decision matrix to solve it. Class students are allowed to help him selecting the alternatives/criteria
- **My right side, second row, first student from the wall.**
- **My left side, fourth row, first student from the wall.**
- **My right side, third row, first student from the wall.**
- **My left side, fifth row, first student from the wall.**

GROUP EXERCISE

Decide which department you are going to choose using one of the above methods