Course specifications of

Theory of Metal Cutting– MDP 371

University: Ain Shams **Faculty: Engineering**

Program on which the course is given:	B. Sc.. in Mechanical Engineering (production)
Major or minor element of program :	N.A.
Department offering the program :	Design and production engineering
Department offering the course:	Design and Production Engineering
Academic year/ Level:	Fourth year/First semester
Date of specification approval:	

A- Basic Information

Title:	**Theory of Metal Cutting**	**Code:**	MDP-371
Credit Hours:	**N.A.**	**Lecture:**	2
Tutorial :	1	**Practical:**	1
Total:	4		

B- Professional Information

1- Overall aims of course

By the end of this course, the student will be able to:

- Assess the cutting conditions required to attain the specified product quality
- Calculate the cutting forces, torque and motor power for different machining processes.
- Explain the different machining phenomena e.g, BUE, chatter, tool failure,…etc
- Select the proper tool material & tool geometry for different machining operations.
- Solve different machining problems, such as tool failure, poor machinability of certain material, chatter occurrence, … etc

2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:

a1. Explain of different problems encountered in machining.
a2. Identify the most proper tool material & tool angles
a3. Explain of tool geometry, selection of machining variables.

b. Intellectual skills:

bl. Calculate the chip compression ratio
b2. Calculate cutting force, torque and power in different machining processes.
b3. Calculate cutting temperature in different machining processes
b4. Calculate the tool life and cutting speed.

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C. Professional and practical skills:

C1. Select tool material.
C2. Solve surface roughness problem and chatter problem.
C3. Determine optimum cutting conditions.

3- Contents

No	Course Content	Lecture	Tut & Lab	Total 1
	Basic concepts & definitions	2	2	4
2	Chip formation	2	2	4
3	Cutting Force	4	4	8
4	Cutting temperature	2	2	4
5	Machinability criteria	2	2	4
6	Machine tool chatter	2	2	4
7	Mechanics of cutting	2	2	4
8	Optimization of machining variables	2	2	4
9	Surface quality	2	2	4
10	Tool failure	2	2	4
11	Tool geometry	4	4	8
12	Tool life relationship	2	2	4
13	Tool material	2	2	4
	Total	30	30	60

4- Assessment schedule

Assessment method	No	Description	Week No	Weight (%)
Assignment	1	Assignment1	3	2
Assignment	2	Assignment2	5	2

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Written Exam	3	Mid-term exam	7	10
Assignment	4	Assignment 3	9	3
Quiz	5	Quiz	10	5
Report	6	Report	11	5
Assignment	7	Assignment4	12	3
Written Exam	8	Final Exam	16	70
Total				100 %

5- List of references

a. Course notes

M. A. El Hakim, theory of metal cutting

b. Essential books (text books)

1-Stephenson, D. A. & Agapiou, " Metal Cutting Theory & process"

2- Shaw, M. C. " Metal Cutting Principles " Technology Press MIT

3- Boothroyd, D. " Fundamentals of Metal Machining & Machine tools", McGraw Hill Co.

6- Facilities required for teaching and learning

1. Appropriate teaching class accommodations including; data show, presentation board and white board.
2. Overhead projector.

Course Content/ILO Matrix

Course Content	a1	a2	a3	b1	b2	b3	b4	c1	c2	c3
Basic concepts & definitions		●		●						
Chip formation	●									
Cutting Force		●							●	
Cutting temperature	●		●							
Machinability criteria				●						
Machine tool chatter				●					●	
Mechanics of cutting					●					
Optimization of machining variables						●				
Surface quality						●				
Tool failure								●		
Tool geometry								●		
Tool life relationship										
Tool material									●	●

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Learning Method /ILO Matrix

Course Content	a1	a2	a3	b1	b2	b3	b4	c1	c2	c3
Lecture	●	●	●	●	●	●	●	●		
Tutorial	●	●	●	●			●		●	●

Assessment Methods /ILO Matrix

Assessment	a1	a2	a3	b1	b2	b3	b4	c1	c2	c3
Assessment 1			●							
Assessment 2			●							
Mid Term exam	●	●	●	●	●	●				
Assessment 3							●			
Qvi3				●				●	●	
Report				●			●	●	●	
Assessment 4		●	●							
Final Exam	●	●	●	●	●	●	●	●	●	●

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