



**COURSE SPECIFICATIONS (2014-2015)**

**Model No.12**

**Course Specifications: Non-Convventional Machining**

**University:** Benha University

**Faculty:** Faculty of Engineering at Shoubra

**Department offering the program:** Mechanical Engineering Department

**Department offering the course:** Mechanical Engineering Department

**1- Course Data**

**Course Code:** MDP451

**Course Title:** Non-Conventional Machining

**Specialization:** production Mechanical Engineering department

**Course Type:** Elective

**Study Year:** Fourth Year

**Teaching Hours:** Lecture: 3

Tutorial: 2

Practical: 0

Total: 5

**2- Course Aim**

**For students undertaking this course, the aims are to:**

1. Know and understand the various types of non-conventional machining processes.

**3- Intended Learning Outcomes of Course (ILO's)**

- a. **Knowledge and Understanding Skills:** On completing this course, students will be able to demonstrate the knowledge and understanding of:
  - a.1) Techniques used in nonconventional machining. (A1)
  - a.2) The basic principles of Electrical discharge machining, Electro chemical machining, Laser machining, Ultrasonic machining, and Water Jet machining. (A4)
  - a.3) The basic principles of Abrasive jet machining, Chemical machining, Electro-chemical Grinding, and Ion beam machining. (A8)
  - a.4) The operating principles of nonconventional machining techniques.
  - a.5) Steps to approach problem solution (A5).
  - a.6) The effect of varying the key parameters on the nonconventional processes. (A11)
  - a.7) The principles of nonconventional processes. (A3)
- b. **Intellectual Skills:** At the end of this course, the students will be able to:
  - b.1) Assess the differences between different types of nonconventional processes. (B6)
  - b.2) Compare between the different types of nonconventional processes. (B8)
  - b.3) Evaluate the performance of the components as well as overall system for power and refrigeration cycles and propose improvements. (B7)
  - b.4) Analyze the performance of nonconventional machines.(B1)
- c. **Practical and Professional Skills:** On completing this course, the students are expected to be able to:
  - c.1) Sketch schematic and accompanying diagrams for Electrical discharge machining, Electro chemical machining, Laser machining, Ultrasonic machining, and Water Jet machining. (C3)
  - c.2) Sketch schematic and accompanying diagrams for Abrasive jet machining, Chemical machining, Electro-chemical Grinding, and Ion beam machining. (C5)
  - c.3) Use the property data table and charts for the key points nonconventional processes. (C14)
  - c.4) Prepare and present technical reports. [C11]
- General and Transferable Skills:** At the end of this course, the students will be able to:
  - d. 1) Communicate effectively.[D1]
  - d. 2) Demonstrate efficient IT capabilities. [D3]
  - d. 3) Search for information and engage in life-long self-learning. [D6]



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**4- Course Contents**

Week no.	Topics
1	Introduction
2	Electrical discharge machining
3	Electro chemical machining
4	Wire electrical discharge machining
5	Laser machining
6	Ultrasonic machining
7	Water Jet machining
8	Mid-term exam
9	Abrasive jet machining
10	Chemical machining
11	Electro-chemical Grinding
12	Ion beam machining
13	Applications
14	Applications
15	Final exam
16	Final exam

**5- Teaching and Learning Methods**

- 5.1 Lectures
- 5.2 Seminar / workshop
- 5.3 Assignments / homework

**6- Teaching and Learning Methods of Disables**

- 2. Nothing.

**7- Student Assessment**

**a- Student Assessment Methods**

- 1. Four assignments to assess knowledge and intellectual skills.
- 2. Two quiz to assess knowledge, intellectual and professional skills.
- 3. Mid-term exam to assess knowledge, intellectual, professional and general skills.
- 4. Final exam to assess knowledge, intellectual, professional and general skills.
- 5. Other

**b- Assessment Schedule**

NO.	Assessment	Week
1	Assignments	5, 7, 9, and 13
2	Quizzes	3, 11
3	Mid-term exam	8
4	Final exam	15

**c- Weighting of Assessments**

Assessment	Weight (%)
Mid-Term Examination	18 %
Final-Term Examination	64%
Practical Examination	05 %
Semester work	08 %
Other types of assessment	05 %
<b>Total</b>	<b>100</b>



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## **COURSE SPECIFICATIONS (2014-2015)**

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### **8- List of References**

**a- Course Notes:** Course notes prepared by the instructor.

#### **b- Recommended Books**

- J. A. Mcgeough, "Advanced Methods of Machining ", London New York – Chapman and Hall, 1978.

#### **c- Recommended Books**

- A.E.DEBARR, & D.A.Oliver "Electrochemical Machining ", Macdonald: London, 1968.

#### **d- Web Sites**

- Periodicals Web sites, etc

**Course Coordinator:** Dr. Raouf Tawfik Fahmy Gabriel

**Head of Department:** Prof. Dr. Osama Ezzat Abdelatif



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FACULTY OF ENGINEERING AT SHOUBRA

COURSE SPECIFICATIONS (2014-2015)

Model No.11A

Course Specifications: Non-Conventional Machining

University: Benha University

Faculty: Faculty of Engineering at Shoubra

Department offering the program: Mechanical Engineering Department

Department offering the course: Mechanical Engineering Department

Matrix of Knowledge and Skills of the Course						
no.	Topics	Week no.	Knowledge and Understanding Skills	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Introduction	1	a1, a2			
2	Electrical discharge machining	2	a4	b2		
3	Electro chemical machining	3	a5	b3		
4	Wire electrical discharge machining	4		b1	c3	
5	Laser machining	5	a7	b2		d1
6	Ultrasonic machining	6		b4	c4	
7	Water Jet machining	7	a5	b1	c1	
8	Midterm exam	8				
9	Abrasive jet machining	9	a3	b1		
10	Chemical machining	10		b4	c1	
11	Electro-chemical Grinding	11	a7			d2
12	Ion beam machining	12	a4	b3	c2	
13	Applications	13	a6	b2		d1
14	Applications	14	a2			d3
15	Final exam	15				
16	Final exam	16				

Course Coordinator: Dr. Raouf Tawfik Fahmy Gabriel

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**FACULTY OF ENGINEERING AT SHOUBRA**

**COURSE SPECIFICATIONS (2014-2015)**

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**Matrix of Course Aims and ILO's**

**Course Title:** Non-conventional machining

**Course Code:** MDP451

**Teaching Hours:** Lecture: 3                      Tutorial: 2                      Total: 5

**Major or minor element of program:** Major

**Program on which the course is given:** B.Sc. Mechanical production Engineering

**Department offering the program:** Mechanical Engineering Department

**Academic year / level:** 2014-2015 Fourth Year / First Semester

**Date of specifications approval:** 2014

Course aims	Basic Knowledge	Intellectual Skills	professional Skills	General Skills
1-Know and understand the various types of non-conventional machining processes	a1,a3,a4,a7	b1,b2,b3,b4	c1,c3,c4	d1,d2,d3

**Course Coordinator:** Dr. Raouf Tawfik Fahmy Gabriel

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