



**A) COURSE**

<b>Course Id:</b>	<b>Course</b>
<b>5504</b>	<b>Manufacturing Processes II</b>

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
3	2	3	8	48

**B) GENERAL COURSE INFORMATION:**

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
<b>Level:</b>				IX	VIII
<b>Course Type (Required/Elective)</b>				Required	Required
<b>Prerequisite Course:</b>				Manufacturing Processes I	Manufacturing Processes I
<b>CACEI Classification:</b>				AE	AE

**C) COURSE OBJECTIVE**

**At the end of the course, the student will be capable of:**

Identify, analyze, select and apply various manufacturing processes, such as cutting, joining processes, coatings, change properties and special processes, according to the need of each given manufacturing process.

**D) TOPICS (CONTENTS AND METHODOLOGY)**

1. Cutting	<b>8 hours</b>
Specific Objective:	The student will learn to identify and analyze the different manufacturing processes that involve removing material with and without a sharp edge defined in the tool, with a fixed and rotary tool.



1.1 Erosion.	
1.1.1 Overview.	
1.1.2 Heat discharge machining.	
1.1.3 Chemical machining.	
1.1.4 Electrochemical Machining.	
1.2 Disassembly, cleaning and evacuation.	
1.3 Machine Tools for cutting.	
1.3.1 Cutting and shearing machines (cutters and dies).	
1.3.2 Lathes.	
1.3.3 Drills.	
1.3.4 Milling.	
1.3.5 Drill-milling machine.	
1.3.6 Machining Centers.	
1.3.7Brushes.	
1.3.8 Broaching.	
1.3.9 Saws and shapers.	
1.3.10 Grinding and grinding wheels.	
1.3.11Burnishing.	
1.3.12 Lapping (Lapping machines).	
1.3.13 Modular units for machine tools (for series production accessories).	
<b>Readings and other resources</b>	Bibliography according to the needs of the subject.
<b>Teaching Methodologies</b>	Exposition of topics, analysis of the concepts presented and exercises.
<b>Learning Activities</b>	Assignments and discussion of these.

<b>2. Processes for joining</b>	<b>7hours</b>
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Specific Objective:	The student will know, identify, analyze and can dispose of the most advanced techniques in the welding industries, adhesives and assemblies, with the intention of joining materials or parts, temporarily or permanently.
2.1 Overview.	
2.2 Welding.	
2.2.1 Welding Processes.	
2.2.2 Types of joints.	
2.2.3 Representation of the seams.	
2.2.4 Calculation of welding.	
2.3 True Welding.	
2.4 False Welding.	
2.4.1 Soft false Welding.	
2.4.2 Hard false Welding.	
2.5 Glue.	
2.6 Welding machines.	
2.6.1 Gas welding machines.	
2.6.2 Arc welding machines.	
2.6.3 Resistance welding machines.	
2.6.4 Other welding machines.	
<b>Readings and other resources</b>	Bibliography according to the needs of the subject.
<b>Teaching Methodologies</b>	Exposition of topics, analysis of the concepts presented and exercises.
<b>Learning Activities</b>	Assignments and discussion of these.

<b>3. Processes for coating</b>	<b>12 hours</b>
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Specific Objective:	The student will know, identify and analyze the secondary processes to strengthen materials or wear parts or environment or protect the product from the material that was made by the machine.
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3.1 Metallic coatings.	
3.1.1 Galvanic Methods.	
3.1.2 Immersion Methods.	
3.1.3 Methods by spraying liquid metal.	
3.1.4 Plating.	
3.1.5 Diffusion.	
3.2 Non-metallic coatings.	
3.2.1 Oxide Coating	
3.2.2 Phosphating, chroming, etc.	
3.2.3 Spray paints, lacquers, varnishes, etc.	
3.2.4 Pelting.	
<b>Readings and other resources</b>	Bibliography according to the needs of the subject.
<b>Teaching Methodologies</b>	Exposition of topics, analysis of the concepts presented and exercises.
<b>Learning Activities</b>	Assignments and discussion of these.

4. Property changes in metals		<b>8hrs</b>
Specific Objective	The student will propose the necessary changes in processes, in order to achieve even greater wear resistance of materials and parts used in harsh environments.	
4.1 Heat Treatment of Steels.		
4.2 Chemical and Heat Treatments.		
4.3 Mechanical and Heat Treatments.		
4.4 Special Treatments.		
<b>Readings and other resources</b>	Bibliography according to the needs of the subject.	
<b>Teaching Methodologies</b>	Exposition of topics, analysis of the concepts presented and exercises.	
<b>Learning Activities</b>	Assignments and discussion of these.	

5. Special manufacturing processes		<b>13 hours</b>
Specific Objective	The student will identify, select and apply the new equipment and methods for manufacturing, since the new production demands have highlighted the need to develop new work techniques.	
5.1 Threading.		
5.1.1 Turning threads.		
5.1.2 Threading with a comb.		
5.1.3 Threading with a die.		
5.1.4 Threading with a tap.		
5.1.5 Threading with a rotating head.		
5.1.6 Thread milling.		
5.1.7 Reworking threads.		
5.1.8 Erosion of threads.		
5.1.9 Lamination of threads.		
5.1.10 Grooving threads.		
5.1.11 Inlay threads.		
5.2 Methods for producing gears.		
5.2.1 Manufacture of spur and helical gears.		
5.2.2 Production of bevel gears.		
5.2.3 Manufacture of worms.		
5.2.4 Making crowns for worm transmissions.		
5.2.5 Machines for manufacturing gear.		
<b>Readings and other resources</b>	Bibliography according to the needs of the subject.	
<b>Teaching Methodologies</b>	Exposition of topics, analysis of the concepts presented and exercises.	
<b>Learning Activities</b>	Assignments and discussion of these.	



#### E) TEACHING AND LEARNING METHODOLOGIES

- Exposition of topics.
- Analysis of the concepts presented.
- Resolution of exercises.
- Assignment of tasks and discussion of these, to encourage collaborative work among students.
- Application of examinations and their corresponding feedback.

#### F) EVALUATION CRITERIA:

Evaluation:	Schedule	Suggested Form of Evaluation and weighing	Topics
1st. Partial Evaluation	session 19	Exam 80%, 20% Tasks 1 and 2	1 y 2
2nd Partial Evaluation	Session 32	Exam 80%, 20% Tasks	3 y 4
3rd. Partial Evaluation	Session 48	Exam 80%, 20% Tasks	5
Final Ordinary Evaluation		100% (Average Partial Ratings)	
Other activities:			
Extraordinary Exam	Week 17 of the semester in course	Exam 100%	100% Topics
Title Exam	According to the schedule of the School Secretary	Exam 100%	100% Topics
Regularization Exam	According to the schedule of the School Secretary	Exam 100%	100% Topics

#### G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

##### Main Books

- MANUFACTURA, INGENIERÍA y TECNOLOGÍA, Serope Kalpakjian y S.R. Schmid, Editorial: Pearson Prentice Hall 5ta, edición 2008.
- PROCESOS DE MANUFACTURA versión SI, Myron L. Begeman, Grupo Editorial Patria, 21ª Reimpresión 2009.
- FUNDAMENTOS DE MANUFACTURA MODERNA, (Materiales, procesos y sistemas), Mikell P. Groover, Editorial: Mc. Graw Hill, 3ra edición 2007.

##### Complementary Books

- MANUAL DE INGENIERO MECÁNICO, Marks, Smith o Morre.

##### Catalogs:

- León Well, S.A. de C.V.,
- Kennametal Inc,
- Mitutoyo Mexicana S.A. de C.V.



- Serviacero Especiales S.A. de C.V.
- Sandvik Coromant, Productos para el mecanizado del
- Metal, Dort, fabricación de piezas por medio de Metalurgia de polvos.

#### Internet Links

[www.iscar.com](http://www.iscar.com) Herramental para maquinas de herramientas fijas y rotativas.

[www.kennametal.com](http://www.kennametal.com) herramental para maquinas herramientas, fijas y rotatorias.