



**A) COURSE**

Course Id:	Course
5601	MATERIALS HANDLING

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
5	0	5	10	80 hours total

**B) GENERAL COURSE INFORMATION:**

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
<b>Level:</b>		IX	X		
<b>Course Type (Required/Elective)</b>		Elective	Elective		
<b>Prerequisite Course:</b>		It requires that have approved 315 credits	It requires that have approved 360 credits		
<b>CACEI Classification:</b>		AE	AE		

**C) COURSE OBJECTIVE**

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

The student will acquire the skills to solve problems related to material handling, so he must know the principles about this topic, knowing the economic factors associated with this activity, and the different ways to handle materials such as: per unit, per container or in bulk. The purpose is to develop their ability to select, design or build equipment and material handling systems.

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

<b>1 General</b>	<b>4 Hours</b>
<b>Specific Objective:</b>	The student must know, definitions and principles in the handling of materials is based.
1 General 1.1 definitions 1.2 objectives 1.3 principles 1.4 procedures	
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.



<b>2. Associated equipment.</b>		<b>5 Hours</b>
<b>Specific Objective:</b>	All materials handling equipment is driven by a prime motor through a computer that modifies the speed, usually an electric motor; so the student must know how to apply the different types of engines to each particular case and know how to select speeders and links required.	
2. Associated equipment. 2.1 electric motors 2.2 speeders 2.3 couplings		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.	

<b>3. Unit load</b>		<b>11 Hours</b>
<b>Specific Objective:</b>	The student must know the methods employed in industries or companies engaged in the manufacture of equipment and spare parts.	
3. Unit load 3.1 pallets and containers 3.2 gravity conveyors 3.3 live roller 3.4 flat band 3.5 chain 3.6 mobile carriage 3.7 elevators 3.8 mobile equipment, Hoists and batteries		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.	

<b>4. Mechanical Support</b>		<b>6 Hours</b>
<b>Specific Objective:</b>	The student must learn to select and calculate cables for different applications.	
4. Mechanical Support 4.1 gear 4.2 chain 4.3 cables, fiber, steel		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.	



<b>5. Cranes and winches</b>		<b>7 Hours</b>
<b>Specific Objective:</b>	The student must know the different types of cranes for various applications, namely to establish a duty cycle and establish the necessary specifications for the selection of a crane.	
5. Cranes and winches 5.1 overhead cranes 5.2 hoists 5.3 winches		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.	

<b>6 Material Bulk</b>		<b>34 Hours</b>
<b>Specific Objective:</b>	In industries of raw materials it is of paramount importance the proper handling of bulk materials, so that the student must know and calculate the necessary equipment for materials handling correct both technically and economically.	
6 Material Bulk 6.1 conveyors 6.2 bucket elevators 6.3 Screw conveyers 6.4 conveyors and vibratory feeders 6.5 chain conveyors (apron, tray, ladder, harrows) 6.6 mobile equipment		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.	

<b>7. Pneumatic transport</b>		<b>8 Hours</b>
<b>Specific Objective:</b>	Pneumatic transport has taken great importance both from the environmental point of view, and from the economic point of view, so the student must know their principles and their application.	
7. Pneumatic transport 7.1 feeders 7.2 spacers 7.3 compressors 7.4 conduction		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	



<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.
----------------------------	--------------------------------------------------------------------------------------------

<b>8. Storage</b>		<b>5 Hours</b>
<b>Specific Objective:</b>	This is the complementary part of a good management system materials, which procedures are recommended, that team should use, as I monitor the warehouse; the student must know how to solve these problems.	
8. Storage 8.1 organization warehouse 8.2 stores operation		
<b>Readings and other resources</b>	Course notes, complementary bibliography, internet pages, videos, product catalogues and power point presentations.	
<b>Teaching Methodologies</b>	Presentation and explanation of topics in class, PPT presentations, student interactions.	
<b>Learning Activities</b>	Taking notes during class, problem solving, homework realization, and project development.	

**E) TEACHING AND LEARNING METHODOLOGIES**

- a) Presentation and explanation of topics in class.
- b) Power Point presentations (PPT)
- c) Analysis and synthesis of concepts.
- d) Problem solving.
- e) Homework and discussion.
- f) Team work.
- g) Course project.

**F) EVALUATION CRITERIA:**

Evaluation:	Schedule	Suggested Form of Evaluation and weighting	Topics
1 <sup>st</sup> partial evaluation.	Session 20	<b>20 % Total Evaluation</b> Partial evaluation: Exam 90% , Assignments 10%	1, 2
2 <sup>nd</sup> partial evaluation.	Session 40	<b>20 % Total Evaluation</b> Partial evaluation: Exam 90% , Assignments 10%	3
3 <sup>rd</sup> partial evaluation.	Session 60	<b>20 % Total Evaluation</b> Partial evaluation: Exam 90% , Assignments 10%	4, 5
4 <sup>th</sup> partial evaluation.	Session 80	<b>20 % Total Evaluation</b> Partial evaluation: Exam 90% , Assignments 10%	6, 7
5 <sup>th</sup> partial evaluation.	Session 100	<b>20 % Total Evaluation</b> Partial evaluation: Exam 90% , Assignments 10%	8



Ordinary final evaluation		<b>100%</b> (Average value of the partial evaluations)	
Second chance final exam	Week 17 of the semester in progress	100% Exam	100% topics
Third chance final exam	According to Secretary school setting	100% Exam	100% topics
Regularization Exam	According to Secretary school setting	100% Exam	100% topics

### G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

#### Main Books

WOODCOCK C.R. AND MASON J.S. BULR SOLIDS HANDLING; LEONARD HILL/ CHAPMAN AND HALL NEW YORK. TECHNICAL PUBLISHING.- MATERIAL HANDLING - PLAN ENGINEERING LIBRARY  
ROSALER ROBERT C. MANUAL DE INGENIERÍA DE PLANTA, TOMO II SECCIÓN 8, MC GRAW HILL.  
DUBBEL, HANDBOOK OF MECHANICAL ENGINEERING, EDITED BY W. BEITZ AND K.-H. KUTTNER. ENGLISH EDITION EDITED BY M.J. SHIELDS. SPRINGER VERLAG LONDON LIMITED 1994.  
KRAUSS, MILTON N. PNEUMATIC CONVEYING OF BULK MATERIALS MC GRAW HILL. C.E.M.A. (EUA): BELT CONVEYORS FOR BULK MATERIALS.  
STANIAR WILLIAM, PLAN ENGINEERING HANDBOOK SECTION 28 , MC GRAW HILL IMMER JOHN R. MANEJO DE MATERIALES, MARCOMBO.  
ERNST HELLMUT, APARATOS DE ELEVACIÓN Y TRANSPORTE, EDITORIAL BLUME. WHITING CORPORATION, CRANE HANDBOOK.  
MORALES PALACIOS OTTO, GRÚAS ELÉCTRICAS VIAJERAS. MANUAL DE CONCEPTOS BÁSICOS.  
MEYERS, FRED F., DISEÑO DE INSTALACIONES DE MANUFACTURA Y MANEJO DE MATERIALES . 3a ED. PEARSON EDUCACIÓN, C2006.

#### Complementary Books

MIRAVETE ANTONIO, LOS TRANSPORTES EN LA INGENIERÍA INDUSTRIAL: (TEORÍA), ZARAGOZA, ESPAÑA: REVERTÉ.  
MIRAVETE ANTONIO, LOS TRANSPORTES EN LA INGENIERÍA INDUSTRIAL: (PROBLEMAS Y PRÁCTICAS), ZARAGOZA, ESPAÑA: ANTONIO MIRAVETE.  
TARGHETTA ARRIOLA, LUIS: TRANSPORTE Y ALMACENAMIENTO DE MATERIAS PRIMAS EN LA INDUSTRIA BÁSICA, MADRID: H. BLUME.  
MIRAVETE ANTONIO, EMILIO LARRODÉ, TRANSPORTE VERTICAL, ZARAGOZA, ESPAÑA: UNIVERSIDAD DE ZARAGOZA.  
MIRAVETE ANTONIO, EMILIO LARRODÉ, TRANSPORTADORES Y ELEVADORES, ZARAGOZA, ESPAÑA: UNIVERSIDAD DE ZARAGOZA.  
EMILIO LARRODÉ, GRÚAS, ZARAGOZA ESPAÑA: UNIVERSIDAD DE ZARAGOZA.  
JAMES A. TOMPKINS, FACILITIES PLANNING, NEW YORK: JOHN WILEY, 2003.  
RAYMOND A. KULWIEC, MATERIALS HANDLING HANDBOOK, NEW YORK: JOHN WILEY & SONS.

#### Internet Links

[http://ocw.uc3m.es/ingenieria-mecanica/ingenieria-de-transportes/pract\\_2\\_grua.pdf](http://ocw.uc3m.es/ingenieria-mecanica/ingenieria-de-transportes/pract_2_grua.pdf)  
<http://ocw.uc3m.es/ingenieria-mecanica/ingenieria-de-transportes/material-de-clase-1/gruas.pdf>