A) COURSE

Course Id:	Course
5625	Fabrication Process II

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
3	0	3	6	48 Hrs. teory

B) GENERAL COURSE INFORMATION:

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
Level:	N.A.	VI	VIII	N.A.	N.A.
Course Type (Required/Elective)		Require	Require		
Prerequisite Course:		**FABRICATION PROCESS I (5697)**	**FABRICATION PROCESS I (5697)**		
CACEI Classification:		CI	CI		

C) COURSE OBJECTIVE

At the end of the course, the student will be capable of:
The student will know , in detail processes classification based on the operating principle of mass or lamina modeling ; as well as tools and equipment used in the manufacturing process.

C) TOPICS (CONTENTS AND METHODOLOGY)

1.- **Overview of processes and machinery used in modeling**		**3 HRS**
Specific Objective:	The student will perform modeling processes and machines to perform them. It will also be able to calculate the parameters necessary to design a manufacturing process	
1.1 Introduction. 1.2 Classification of modeling processes. 1.3 Mass modeling processes. 1.3.1 Process modeling mass. 1.3.2 Process modeling sheet. 1.4 Overview of machines		
Readings and others resources	Books, Articles, Complementary bibliography, Internet. Reading articles and research (Foundry).	
Teaching Methods	Class presentation , Analysis of the concepts presented , exercises , Collaborative Work , case studies , demonstration with specialized software , Collaborative Learning	
Learning Activities	Teamwork dynamics, assignments and discussion of these . Research summaries, concept maps, consultations on specialized sites	

2.- Fundamentals of metallurgy in modeling.	**7 HRS**

Specific Objective:	The student will identify the basic principles of metallurgy involved in the modeling process
2.1 Introduction. 2.2 Deformation of the ideal structure. 2.3 Structural failures. 2.4 Deformation by existing movements. 2.5 Origin of new displacements. 2.6 Explanation of deformation through the theory of displacement. 2.7 Hardening caused by deformation. 2.8 Phenomena caused by heating materials	
Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet
Teaching Methods	Class presentation, collaborative work, problem-based learning.
Learning Activities	Teamwork dynamics, assignments and discussion of these. Development laboratory practices applying theoretical concepts. Practice reports, group and individual problem solving.

3.- **Fundamentals of the theory of plasticity.**	**4 HRS**
Specific Objective:	It will compare the parameters of plasticity involved in processes modeling .
3.1 Ability to change shape. 3.2 Elementary theory of plasticity. Panorama 3.3 on the advanced theory of plasticity	
Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet.
Teaching Methods	Class presentation , collaborative work , problem- based learning
Learning Activities	Teamwork dynamics , assignments and discussion of these . Readings , research summaries, concept maps, consultations on specialized sites.

4.- **Friction and lubrication**	**7 HRS**
Specific Objective:	The student will identify the needs and the effects of lubrication change processes so non-cutting
4.1 Elements of friction. 4.2 Dragging solid body. 4.3 Friction with intermediate material. 4.4 Dependence of friction value. 4.5 Roughness and surface treatment. 4.6 Influence of friction on the die or mold. 4.7 Requirement on lubricant	
Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet.
Teaching Methods	Class presentation , collaborative work , problem- based learning
Learning Activities	Teamwork dynamics , assignments and discussion of these . Readings , research summaries, concept maps, consultations on specialized sites.

5.- **Modeling mass**	**5 HRS**
Specific Objective:	The student will identify the basic parameters of mass modeling to thereby perform calculations of this process
5.1 General. 5.2 Materials and tools. 5.3 Testing of working materials	

Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet.
Teaching Methods	Class presentation , collaborative work , problem- based learning
Learning Activities	Teamwork dynamics , assignments and discussion of these . Readings , research summaries, concept maps, consultations on specialized sites.

6.- **Modeling sheet.**		**5 HRS**
Specific Objective:	The student will identify the basic parameters of modeling sheet to thereby perform calculations of this process	
6.1 General. 6.2 Materials 6.3 Tests on the sheet		
Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet.	
Teaching Methods	Class presentation , collaborative work , problem- based learning	
Learning Activities	Teamwork dynamics, assignments and discussion of these . Readings, research summaries, concept maps, consultations on specialized sites.	

7.- **Modeling processes.**		**10 HRS**
Specific Objective:	The student will identify mass modeling processes	
7.1 mass modeling processes, 7.1.1 Upsetting 7.1.2 Forgings 7.1.3 Laminate 7.1.4 Print 7.1.5 Extruded 7.1.6 Wire drawing or drawing 7.1.7 Mass Embutido 7.2 Modeling processes sheet. 7.2.1 Deep drawing on positive mold, neck , etc. 7.2.2 Embossing 7.2.3 Fold 7.2.4 Bending 7.2.5 Rolado		
Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet.	
Teaching Methods	Class presentation , collaborative work , problem- based learning	
Learning Activities	Teamwork dynamics, assignments and discussion of these . Readings, research summaries, concept maps, consultations on specialized sites.	

8.- **Machine tools and tools**		**7 HRS**
Specific Objective:	The student will identify the basic machinery for mass modeling processes .	
8.1 Machinery used in modeling. 8.2 Tooling for modeling.		
Readings and others resources	Books, Articles, Regulations , Complementary bibliography , Internet.	
Teaching Methods	Class presentation , collaborative work , problem- based learning	

Learning Activities	Teamwork dynamics, assignments and discussion of these . Readings, research summaries, concept maps, consultations on specialized sites.

E) TEACHING AND LEARNING METHODOLOGIES

a) Conventional Exposure of each subject by the teacher, using materials such as board.
b) Analysis of the concepts presented.
c) Resolution of exercises.
d) Allocation of tasks and discussion of these, to encourage collaborative work among students.
e) Application of tests.

F) EVALUATION CRITERIA:

Evaluation	Periodicity	Evaluation form and suggested weighting	Subjects covered
First partial evaluation	Session 16	**33 % Total Evaluation** Parcial evaluation: Exams 80% , Assignments 20%	1,2,3
Second partial evaluation	Session 32	**33 % Total Evaluation** Parcial evaluation Exams 80% , Assignments 20%	4, 5, 6
Third parcial evaluation	Session 48	**33 % Total Evaluation** Parcial evaluation Exams 80% , Assignments 20%	7, 8
Ordinary final evaluation		1 **100%** (Average partial assessments)	
Others activities:	Laboratory includes: Casting: 32 hrs . With activities specified in the corresponding Manual		
Second chance final exam	Week 17 of the semester in progress	100% Exam	100% Notes
Third chance final exam	According to Secretary school setting	100% Exam	100% Notes
Regularization Exam	According to Secretary school setting	100% Exam	100% Notes

G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

Basic Books

Modern manufacturing processes
Mikell P. Groover
Editorial Pearson Education, 1997

Manufacture process
John A. Schey
Editorial Mc. Graw -Hill, 3rd edition 2002

Principle of Manufacturing Engineering
Chiles, Black, Lissaman.
Editorial CECSA, 1st edition 1999

Castings,
J. Campbell,
Heineworth Butterworth, 2nd edition 2003

Supplementary Books

Fundamentals of Modern Manufacturing
(Materials , processes and systems)
Mikell P. Groover
Prentice Hall

SI version manufacturing processes
Myron L. Begeman
Ed. CECSA 13th reprint 1998

Basic manufacturing processes
H. C. Kasanas , Glenn E. Baker
Ed Mc . Graw -Hill

Manufacturing , Engineering and Technology
Serope Kalpakjian , Steven R. Schmid
Ed. Pearson , 2002 .

Mechanical Engineer's Handbook
Dubbel W. Beitz , K. H. Küttner
ed . Springer - Verlag

Materials and Manufacturing Processes for Engineers
Laurence E. Doyle , Carl A. Keyser, Lames L. Leach
Ed . Prentice Hall

Metal Technology
A. Kucher
Mir Publishers Moscow

Internet sites

http://www.kenametal.com

http://www.serviacero.com/especiales

http://www.aws.org