A) COURSE

Course Id:	Course
5691	Dinamics

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
3	2	3	8	80 hrs. total

B) GENERAL COURSE INFORMATION:

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
Level:	IV	III	III	III	III
Course Type (Required/Elective)	Elective	Elective	Elective	Elective	Elective
Prerequisite Course:	Statics (5694) Calculus B (0052)	Statics (5694) Calculus B (0052)	Statics (5694) Calculus B (0052)	Statics (5694) Calculus B (0052)	Statics (5694) Calculus B (0052)
CACEI Classification:	CB	CB	CB	CB	CB

C) COURSE OBJECTIVE

At the end of the course, the student will be capable of:
At the end of the course the student would have the ability to analyze different problem matters relative to particle and rigid bodies' movement geometry. Such analysis can be done on a logical and simple mode and at the same time considering diverse causes that promote movement.

D) TOPICS (CONTENTS AND METHODOLOGY)

1.- Particle kinematics		**12 hours**
Specific Objective:	**Objective 1:** Student would learn curved and linear motion theory for a particle and at the same time will apply and solve several examples for a better understanding.	

1.1 Motion equations 1.1.1 Introduction 1.1.2 Position, velocity and acceleration 1.1.3 Determining the motion of a particle 1.2 Linear motion of particles 1.2.1 Motion along a straight line 1.2.2 Motion with constant acceleration 1.3 Motion components 1.3.1 Rectangular components of speed and acceleration 1.3.1.1 Absolute motion 1.3.1.2 Relative motion 1.3.2 Projectile motion 1.3.3 Tangential and normal components of acceleration Radial and transversal components of speed and acceleration	
Readings and other resources	Mecánica vectorial para ingenieros- Dinámica, Beer y Johnston, McGraw Hill. Seely, F; Ensign, N, Mecánica analítica para ingenieros, Uteha, México. Mc Grill, D; King, W, Mecánica para ingenieros TOMO II, Grupo editorial iberoamericana. México 1991. *Ingeniería Mecánica, DINÁMICA, R.C. Hibbeler, Prentice Hall/ Pearson.*
Teaching methods	Inductive method: going from general to particular knowledge. Group based learning to cope with basic theoretical knowledge.
Learning activities	Lab practicing to apply concepts taught during class. It is mandatory to present task reports

2.-Rigid body kinematics		**12 hours**
Specific Objective	**Objective 2:** The student would be capable enough to understand the rigid body movement and at the same time make a comparison to differentiate the several planar trajectories to apply the proper equations.	
2.1 Circular motion 2.1.1 Rotation with constant angular acceleration 2.1.2 Relating linear and angular kinematics 2.1.3 Simple harmonic motion 2.2 Relative motion 2.2.1 Referenced axis systems 2.2.2 Relative velocity 2.2.3 Coriolis acceleration 2.3 Planar movement 2.3.1 Rotational motion Instantaneous center of mass		
Readings and others resources	Mecánica vectorial para ingenieros- dinámica, Beer y Johnston, McGraw Hill. Seely, F; Ensign, N, Mecánica analítica para ingenieros, Uteha, México. Mc Grill, D; King, W, Mecánica para ingenieros TOMO II, Grupo editorial iberoamericana. México 1991. *Ingeniería Mecánica, DINÁMICA, R.C. Hibbeler, Prentice Hall/ Pearson.*	
Teaching methods	Inductive method: going from general to particular knowledge. Group based learning to cope with basic theoretical knowledge.	
Learning activities	Lab practicing to apply concepts taught during class. It is mandatory to present task reports	

3.-Center of mass and moments of inertia		**15 hours**
Specific Objective:	**Objective 3:** The student would learn how to calculate distributed loads on structural elements. Learn how to find the center of gravity of different geometrical bodies.	
3.1 Center of mass of a tridimensional body 3.2 Center of mass of a volume 3.3 Compound body 3.4 Determine Center of mass of a volume by integrating method 3.5 Moment of inertia of a mass element 3.6 Paralell axis theorem 3.7 Moment of inertia of sheets 3.8 Determine moment of inertia of a tridimensional body by integrating method Moment of inertia of a compound body		
Readings and other resources	Mecánica vectorial para ingenieros- dinámica, Beer y Johnston, McGraw Hill. Seely, F; Ensign, N, Mecánica analítica para ingenieros, Uteha, México. Mc Grill, D; King, W, Mecánica para ingenieros TOMO II, Grupo editorial iberoamericana. México 1991. *Ingeniería Mecánica, DINÁMICA, R.C. Hibbeler, Prentice Hall/ Pearson.*	
Teaching methods	Inductive method: going from general to particular knowledge. Group based learning to cope with basic theoretical knowledge.	
Learning activities	Lab practicing to apply concepts taught during class. It is mandatory to present task reports	

4.- Particle Dinamics		**15 hours**
Specific Objective:	**Objective 4:** The student will relate force Newton Laws and the mass and acceleration concepts. Will learn about English and International Units Systems**.**	
4.1 Introduction 4.2 Newton´s Laws 4.3 Mathematical expression of the second Law of Newton 4.4 Mass Concepts 4.5 Motion equations of a dot 4.6 Linear motion of a particle 4.7 Rotational motion of a particle 4.8 Motion caused by a central force Newton´s Law of Gravitation		
Readings and other resources	Mecánica vectorial para ingenieros- dinámica, Beer y Johnston, McGraw Hill. Seely, F; Ensign, N, Mecánica analítica para ingenieros, Uteha, México. Mc Grill, D; King, W, Mecánica para ingenieros TOMO II, Grupo editorial iberoamericana. México 1991. *Ingeniería Mecánica, DINÁMICA, R.C. Hibbeler, Prentice Hall/ Pearson.*	
Teaching methods	Inductive method: going from general to particular knowledge. Group based learning to cope with basic theoretical knowledge.	
Learning activities	Lab practicing to apply concepts taught during class. It is mandatory to present task reports	

5.- Work and Energy		**12 hours**
Specific Objective:	**Objective 5:** The student will learn and analyze work, energy, power and efficiency concepts.	

5.1 Introduction 5.2 Work produced by a force 5.3 Work produced by a moment 5.4 Kinetic energy of a particle 5.5 Work and energy principles 5.6 Potential energy 5.7 Conservative and none conservative forces 5.8 Energy Conservation Principle Power and efficiency	
Readings and other resources	Mecánica vectorial para ingenieros- dinámica, Beer y Johnston, McGraw Hill. Seely, F; Ensign, N, Mecánica analítica para ingenieros, Uteha, México. Mc Grill, D; King, W, Mecánica para ingenieros TOMO II, Grupo editorial iberoamericana. México 1991. *Ingeniería Mecánica, DINÁMICA, R.C. Hibbeler, Prentice Hall/ Pearson.*
Teaching methods	Inductive method: going from general to particular knowledge. Group based learning to cope with basic theoretical knowledge.
Learning activities	Lab practicing to apply concepts taught during class. It is mandatory to present task reports

6.- Rigid Body Dinamics		**14 hours**
Specific Objective:	**Objective 6:** The student will apply all the previous related principles to understand solid and rigid bodies' motion.	
6.1 Introduction 6.2 Mass Moment of inertia 6.3 Planar Motion of Solid Rigid Body 6.4 Solid Rigid Body Energy and Work Principles 6.5 Solid Rigid Body Force Calculations 6.6 Power as an Energy Conservation Principle 6.7 Momentum and Impulse Conservation of Momentum		
Readings and other resources	Mecánica vectorial para ingenieros- dinámica, Beer y Johnston, McGraw Hill. Seely, F; Ensign, N, Mecánica analítica para ingenieros, Uteha, México. Mc Grill, D; King, W, Mecánica para ingenieros TOMO II, Grupo editorial iberoamericana. México 1991. *Ingeniería Mecánica, DINÁMICA, R.C. Hibbeler, Prentice Hall/ Pearson.*	
Teaching methods	Inductive method: going from general to particular knowledge. Group based learning to cope with basic theoretical knowledge.	
Learning activities	Lab practicing to apply concepts taught during class. It is mandatory to present task reports	

E) TEACHING AND LEARNING METHODOLOGIES

F) EVALUATION CRITERIA:

Evaluation:	Periodicity	Suggested Ponderability to Evaluate	Themes to cover
1er. Partial Evaluation	20 Session	**25 % Ponderability** Partial Evaluation: Exam 80%, Extra work during class hour 10%, Participating in class hour 10%.	1 y 2

2da. Partial Evaluation	40 Session	**25 % Ponderability** Partial Evaluation: Exam 80%, Extra work during class hour 10%, Participating in class hour 10%.	3
3er. Partial Evaluation	60 Session	**25 % Ponderability** Partial Evaluation: Exam 80%, Extra work during class hour 10%, Participating in class hour 10%.	4 y 5
4ta. Partial Evaluation	80 Session	**25 % Ponderability** Partial Evaluation: Exam 80%, Extra work during class hour 10%, Participating in class hour 10%.	5 y 6
Ordinary Final Evaluation		Partial Evaluation Average	
Extraordinary Exam	17th week of the semester	100% Exam	100% Themes
Title Exam	According Scholar Secretariat	100% Exam	100% Themes
Regularization Exam	According Scholar Secretariat	100% Exam	100% Themes

G) BIBLIOGRAPHY AND INFORMATIC RESOURCES

Basic Text Book

Mecánica vectorial para ingenieros- dinámica
Beer y Johnston
McGraw Hill
9a. edición 2010

Mecánica analítica para ingenieros
Seely, F; Ensign, N
Uteha, México
Mecánica para ingenieros TOMO II
Grupo editorial iberoamericana. México
1992

Complementary

DINÁMICA: Ingeniería Mecánica
R.C. Hibbeler
Prentice Hall/ Pearson.
10ª. Edición 2004

Internet Sites:

Moodle Platform
Sociedad Americana de Ingenieros Mecánicos: ASME
https://www.asme.org

Data Bases:

About materials properties.

http://www.matweb.com
Fundamental knowledge on Mechanic Engineering materials, unit conversion factors, mechanical design, equations and formulae, fabricating processes, solid mechanics, fluids and mathematics. http://www.efunda.com/home.cfm

Simulate Software:
MD Solid Simulator