

UNIVERSIDAD AUTÓNOMA DE BAJA CALIFORNIA

COORDINACIÓN GENERAL DE FORMACIÓN BÁSICA COORDINACIÓN GENERAL DE FORMACIÓN PROFESIONAL Y VINCULACIÓN UNIVERSITARIA PROGRAMA DE UNIDAD DE APRENDIZAJE

I. IDENTIFICATION INFORMATION

- 1. Academy unit:** Facultad de Ingeniería, Mexicali; Facultad de Ingeniería, Arquitectura y Diseño, Ensenada; Facultad de Ciencias de la Ingeniería y Tecnología, Valle de las Palmas.
- 2. Study program:** Civil Engineer
- 3. Plan duration:** 2020-1
- 4. Name of the learning unit:** Transportation Systems
- 5. Code:** 36021
- 6. HC:** 01 **HL:** 00 **HT:** 02 **HPC:** 00 **HCL:** 00 **HE:** 01 **CR:** 04
- 7. Learning stage to which it belongs:** Disciplinary
- 8. Character of learning unit:** Obligatory
- 9. Requirements for enrollment to learning unit:** None



PUA formulated by

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II. GENERAL PROPOSE OF THE COURSE

This course has the objective of providing the student with a general vision of the elements and characteristics of transportation systems, and express the importance of these systems in the economic and social dynamics of the territory. The course also aims to develop in the student a capacity of analysis beginning with the revision of specialized texts and case studies on transportation matters.

This course is of mandatory character and is located in the disciplinary stage and belongs the area of Transportation Engineering.

III. COURSE COMPETENCIES

Analysis transportation systems, through the identification of the elements that integrate them, characteristics, efficiency and mobility, that permit establishing possible intermodal chains of transportation, with analytical and systematical attitude and of environmental responsibility.

IV. EVIDENCES OF PERFORMANCE

Evidence portfolio product of workshop activities which includes: reports, presentations of analysis revision of case studies that were elaborated in teamwork, as well as lecture reports of participation in discussion forums those which are elaborated individually by the students, which permit the student to develop the capacity to comprehend analyzed content.

V. DEVELOPMENT BY UNITS

UNIT I. General vision of transportation

Competence:

Recognize transportation as a composed system, dynamic and intermodal, through the study of its infrastructure, utility of its based territories and geographical conditioning, in order to value the importance of transportation in the present, with reflexive attitude and of respect for the environment.

Content :**Duration:** 4 hours**1.1 Transportation systems**

- 1.1.1 Basic elements, infrastructure and control instruments for transport operation
- 1.1.2 Historical evolution of transportation and its importance in modern society
- 1.1.3 Analysis of transportation systems from its territorial base and geographical conditioning
- 1.1.4 Transport classification
- 1.1.5 Intermodal systems of transport
- 1.1.6 Present transportation situation in Mexico

UNIT II. Transportation systems in ports

Competence:

Identify the elements that integrate transportation systems in ports, through case studies in order to describe the operation of these in function with the capacity it counts on, with reflexive attitude and teamwork.

Content :

Duration: 4 hours

2.1 Maritime and fluvial ports

2.1.1 Infrastructure

2.1.2 Transportation units and terminals

2.1.3 Logistic transport of containers

2.1.4 Case studies

2.2 Airports

2.2.1 Transportation units and terminals

2.2.2 Particular characteristics of the strips

2.2.3 Case studies

UNIT III. Terrestrial transportation systems

Competence:

Describe the characteristics of the elements that integrate terrestrial transportation systems, through study of its infrastructure, technology, efficiency and mobility indicators, to establish qualitative grades of efficiency and integration based on the relations and opportunities that the transportation system has to offer, with analytical attitude and in a responsible manner.

Content :

Duration: 8 hours

3.1 Elements of terrestrial transportation systems

3.1.1 Infrastructure

3.1.1.1 Lineal elements of the urban roads system

3.1.1.2 Punctual elements of the urban roads system

3.1.1.2.1 International border ports of entry

3.1.1.2.2 High specification roads

3.1.1.3 Punctual elements of the interurban roads system

3.1.1.4 Regulations for the construction of roads and road safety

3.1.1.5 Railway transportation

3.1.2 Vehicle technology

3.1.2.1 Collective transportation

3.1.2.2 Private transportation

3.1.2.3 Other modes of terrestrial transportation

3.1.3 Terrestrial transportation system efficiency indicators

3.1.4 Road system integration

3.2 Urban mobility analysis

3.2.1 Case studies

VI. STRUCTURE OF WORKSHOP PRACTICES

| Practice No. | Competency | Description | Support Material | Time |
|-----------------|---|--|---|---------|
| UNIT I | | | | |
| 1 | Investigate present situation of the transportation system in Mexico, consulting official sources to present the inventory of infrastructure of transportation and its principal characteristics, with critical attitude and in a collaborative manner | Create a case study for the transportation system of Mexico and present its elements, characteristics and integration. Present in group a brief presentation in the classroom or supported by a video presentation explaining the relevant aspects carried out in the study. Participate in the discussion forums as directed by the teacher. | Internet references from official sources, material provided by the teacher, computer, projector, speakers, and software. | 8 hours |
| UNIT II | | | | |
| 2 | Highlight the advantages and disadvantages offered by transport in maritime ports and airports, from the case analysis of important maritime ports and airports, to briefly explain the operation of this transportation system, with critical attitude and in a collaborative manner | Create two case studies one on two or more maritime ports and another on two or more airports. Present in a group a brief presentation for each study in the classroom or supported by a video presentation explaining the relevant aspects carried out in the study. Elaborate two lecture reports and participate discussion forums and/or debate in the classroom about the functionality of the transportation systems of maritime and airports. | Internet references from official sources, material provided by the teacher, computer, projector, speakers, and software. | 8 hours |
| UNIT III | | | | |
| 3 | Highlight the advantages and disadvantages offered by terrestrial transportation, from the case analysis of highways, to | Create a case study on two or more important interurban roads. Present in group a brief | Internet references from official sources, material provided by the teacher, computer, projector, speakers, and software. | 8 hours |

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|---|---|--|---|---------|
| | <p>briefly explain the operation of this transport system, with critical attitude and in a collaborative manner.</p> | <p>presentation for each study in the classroom or supported by video presentation where relevant aspects of the carried out study are explained. Elaborate two lecture reports and participate in discussion forums to explain the functionality of the terrestrial transport system. The first report is on the system of road, the other on vehicles with a comparative table of their characteristics.</p> | | |
| 4 | <p>Inspect an urban road axis through a documental investigation and recognition projects in the field, to identify the elements of the transportation system of roads, quantifying and determining their characteristics, with serious attitude, responsibility and in a collaborative manner.</p> | <p>Create a case study on an important road axis of the city, investigating from official sources, go out to field to identify, quantify and verify the present condition and operation of the elements revised in the classroom. Document everything in notes, photos, and/or video; afterwards create a brief presentation in teams of the analyzed road axis, evaluation through rubric.</p> | <p>Internet references from official sources, checklist of elements to identify during the recognition assignment in the field.</p> | 8 hours |

VII. WORK METHOD

Framing: The first day of class the teacher must establish the form of work, evaluation criteria, quality of academic work, rights and obligations for teacher and students.

Teaching strategy (teacher)

- Through the teaching method of presentation in the classroom and digital media
- Practice assignments on workshops where case studies are analyzed
- Presentations and/or participation in discussion forums
- Mediator of discussion forums
- Elaborate and apply exams
- Help promote in the active participation of the students

Learning strategy (student)

- Through the revision of specialized lecture texts and case studies of different transportation systems, good practices and success cases in transport and/or its infrastructure in Mexico and the world, like the collaborative work in workshops that involve the creation of content
- Participation in discussion forums, theoretical and practical case studies.
- Solve exams
- Prepare presentations and present to classmates and teacher about different transportation systems

VIII. EVALUATION CRITERIA

The evaluation will be carried out permanently during the development of the learning unit as follows:

Accreditation Criterion

- To be entitled to ordinary and extraordinary exam, the student must meet the attendance percentages established in the current School Statute.
- Scaled from 0 to 100, with a minimum approval of 60.

Evaluation criteria

- | | |
|---|-------------|
| - 2 quarter exams (25% each)..... | 50% |
| - Achievement evidence: Portfolio of workshop practices..... | 50% |
| - Reports of six lectures with participation in discussion forums (individual)..... | 15% |
| - Revision of five case studies with presentation (teams)..... | 35% |
| Total..... | 100% |

IX. REFERENCES

| Required | Suggested |
|--|--|
| <p>Cascetta, E. (2013). <i>Transportation systems engineering: theory and methods (Vol. 49)</i>. United States: Springer Science & Business Media. [clásica]</p> <p>Crespo, C. (2007). <i>Vías de comunicación: caminos, ferrocarriles, aeropuertos, puentes y puertos</i>. México: Editorial Limusa. [clásica]</p> <p>Janic, M. (2017). <i>Transport Systems: Modelling, Planning, and Evaluation</i>. United States: Crc Press.</p> <p>Pyrgidis, C. N. (2016). <i>Railway transportation systems: design, construction and operation</i>. United States: CRC Press.</p> <p>Rodriguez, J. P., Comtois, C., and Slack, B. (2018). <i>The geography of transport systems</i>. United States: Routledge.</p> | <p>Aguayo, J. M. R. (2009). <i>Infraestructura del transporte: enfoque integral</i>. España: Universidad del País Vasco. [clásica]</p> <p>Banco Mundial (2018) <i>Indicadores por país</i>. Recuperado de: https://datos.bancomundial.org/indicador/IS.AIR.PSGR?locations=MX&view=chart</p> <p>Hay, W. (1983). <i>Ingeniería de transporte</i>. Chile: Editorial Limusa [clásica]</p> <p>Merritt, F. S. (1992). <i>Manual del ingeniero civil, Tomo 2</i>. México: McGraw-Hill. [clásica]</p> <p>Secretaría de Comunicaciones y Transportes (1991). <i>Manual de proyecto geométrico de carreteras</i>. México: SCT [clásica]</p> |

X. TEACHER PROFILE

The teacher of this course must possess an engineering title in civil engineering or in transportation, preferably a masters or doctorate in science or engineering. Count on professional experience in the sector, as well as teaching experience and/or have accredited teacher formation courses in the last 5 years. It is recommended that he or she possess qualities in effective communication, responsible, analytical, systematic, knowledge in geographical information systems.