Course guide
220280 - 220280 - Heat and Mass Transfer

Last modified: 02/04/2024

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 724 - MMT - Department of Heat Engines.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN RESEARCH IN MECHANICAL ENGINEERING (Syllabus 2021). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 5.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Oliva Llena, Asensio

Others: Perez Segarra, Carlos David
Castro Gonzalez, Jesus
Trias Miquel, Francesc Xavier

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.

Transversal:
2. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

TEACHING METHODOLOGY

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LEARNING OBJECTIVES OF THE SUBJECT

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STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	24.00
Hours small group	15,0	12.00
Self study	80,0	64.00

Total learning time: 125 h

CONTENTS

(ENG) Mòdul 1: Introducció. Transferència de calor per conducció

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 40h
Theory classes: 10h
Laboratory classes: 5h
Self study : 25h

(ENG) Mòdul 2: Transferència de calor per radiació

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 40h
Theory classes: 10h
Laboratory classes: 5h
Self study : 25h

(ENG) Mòdul 3: Transferència de calor per convecció

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 45h
Theory classes: 10h
Laboratory classes: 5h
Self study : 30h

ACTIVITIES

(ENG) Classes de Teoria

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 37h
Self study: 15h
Theory classes: 20h
Laboratory classes: 2h

(ENG) Classes de problemes

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 53h
Self study: 30h
Theory classes: 10h
Laboratory classes: 13h

(ENG) Treball de curs

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 30h
Self study: 30h

(ENG) Examen primer parcial

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 2h
Theory classes: 2h

(ENG) Examen 2on parcial (final)

Related competencies :
CEETERM1. Knowledge and ability to analyze the processes of heat transfer that allows the design and calculation of equipment and thermal applications.
CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 3h
Theory classes: 3h

GRADING SYSTEM

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BIBLIOGRAPHY

Basic:
- Eckert, E.R.G.; Drake, R.M. Analysis of heat and mass transfer. Washington: Hemisphere, 1972. ISBN 0891165533.
- Incropera, F.P.; DeWitt, D.P. Fundamentos de transferencia de calor. 4ª ed. México: Prentice Hall, 1999. ISBN 9701701704.
- Mills, Anthony F. Transferencia de calor. México DF [etc.]: Irwin, 1995. ISBN 8480861940.
- Kreith, F.; Bohn, M.S. Principios de transferencia de calor. 6a ed. Madrid: International Thomson, cop. 2002. ISBN 8497320611.
- Lienhard IV, J.H.; Lienhard V, J.H. A heat transfer textbook [on line]. 3rd ed. Cambridge: Phlogiston Press, 2004 [Consultation: 16/10/2024]. Available on: https://ahtt.mit.edu.

Complementary:
- Patankar, Suhas V. Numerical heat transfer and fluid flow [on line]. Washington: New York: Hemisphere; McGraw-Hill, cop. 1980 [Consultation: 16/11/2022]. Available on: https://www-taylorfrancis-com.recursos.biblioteca.upc.edu/books/mono/10.1201/9781482234213/numerical-heat-transfer-fluid-flow-suhas-patankar. ISBN 9780891165224.
- Rohsenow, W.M.; Hartnett, J.P; Cho, Y.I. (eds.). Handbook of heat transfer. 3rd ed. New York [etc.]: McGraw-Hill, cop. 1998. ISBN 0070535558.
- Bradshaw, Peter. An introduction to turbulence and its measurement. Oxford; New York: Pergamon Press, 1971. ISBN 080166202.
- Libby, Paul A. Introduction to turbulence. Bristol, PA: Taylor & Francis, 1996. ISBN 1560321008.
- Cebeci, T.; Bradshaw, P. Physical and computational aspects of convective heat transfer. New York: Springer, 1984. ISBN 0387120971.
- Wilcox, David C. Turbulence modelling for CFD. 2nd ed. La Cañada, CA: DCW Industries, 1998. ISBN 0963605151.

RESOURCES

Audiovisual material:
- Apunts fets pel professorat de l'assignatura. Resource