INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

DPT GENIE ENERGETIQUE ET ENVIRONNEMENT
ENERGETICS AND ENVIRONMENTAL ENGINEERING
INSA Campus LyonTech - 9 rue de la Physique
Batiment Sadi Carnot - 69621 VILLEURBANNE
Phone 0472438430
E-mail : gen-s@insa-lyon.fr

Thermodynamics

Buildings Energy

IDENTIFICATION

CODE : GEN-4-S2-EC-ENBA
ECTS : 2.0

HOURS

Lectures :	12.0 h
Seminars :	18.0 h
Laboratory :	6.0 h
Project :	0.0 h
Teacher-student contact :	36.0 h
Personal work :	0.0 h
Total :	36.0 h

ASSESSMENT METHOD

Continuous evaluation after each tutorial class

TEACHING AIDS

Handout, slideshow and documentation available for download in Moodle

TEACHING LANGUAGE

French

CONTACT

M. CLAUSSE Marc
marc.clausse@insa-lyon.fr

AIMS

OBJECTIVES : to get students familiar with building energy issues and with occupant thermal confort.

SKILLS :
- to be able to use software tools of dynamic thermal simulation (DTS, e.g. TRNSys) to study building behaviour
- to be able to use these DTS tools to estimate cooling and heating loads
- to be able to roughly design production, distribution and emission systems for cooling and heating
- to be able to propose solutions to mitigate cooling and heating loads
- to ba able to check building conformity to thermal regulation (e.g. RT2012) by using dedicated software solutions (e.g. ClimaWin)

CONTENT

1 - Issues in building energy management & Thermal Confort
2 - Building envelop energy balance, heat transfer modelisation
3 - External and internal loads, ASHRAE method for load calculation
4 - Technical solutions for heat and cold productin distribution and emission
5 - Thermal Regulation for new buildings (RT2012)
6 - Thermal Regulation for building renovation

These concepts will be applied thanks to tutorials based on software solutions like TRNSys or ClimaWin

BIBLIOGRAPHY

1/ Le Recknagel (Tomes 1 ; 2 et 3), Manuel pratique du génie climatique, Recknagel, Sprenger, Honmann, PYC Edition, Paris
2/ Conception et calcul des procédés de climatisation, Brun, Porcher, Edition CFP, Paris
3/ Cours de Climatisation, Porcher, Edition CFP, Paris
4/ ASHRAE Handbook, Editions ASHRAE, mise à jour annuelle
5/ Génie climatique, Techniques de l'Ingénieur, Vol. B2-I, Paris
6/ La filtration de l'air, Rault, Edition CFP, Paris
7/ Climatisation et conditionnement d'air modernes, Reinmuth, PYC, Paris, 1996.

PRE-REQUISITE

Thermodynamics (GEN-3-therm), Heat Transfer (GEN-3-trans), or equivalent