

ENGR 7007 FIRE ENGINEERING 2 (FIRE MODELS)

Credit Points 10

Legacy Code 300710

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Description This subject aims to develop an understanding of various types of computational tools used in engineering design of fire safety systems. The fundamentals of control volume, applications of conservation laws in modeling and the form of predictive equations are explained. The content includes evaluations of fire severity, fire resistance levels of various types of building structures and elements. Hand calculation equations, zone models and field models are covered. The limitations of the models in representing the real phenomena are also discussed.

School Eng, Design & Built Env

Discipline Fire Technology

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Postgraduate Coursework Level 7 subject

Equivalent Subjects LGYC 0673 - Fire Engineering 2 (Fire Models)

Restrictions

Students must be enrolled in a postgraduate program.

Assumed Knowledge

Physics, chemistry, engineering mathematics, building regulations, fire dynamics, building fire services.

Learning Outcomes

1. Explain the basic principles of the fire phenomenon including the nature of fire, heat transfer, burning of gases, liquids and solids, initiation and propagation and products of combustion
2. Identify fire hazards & causes of fires and health effects of toxic smoke
3. Determine fire loads, fire growth, ventilation factor
4. Explain flashover, fire severity and fire resistance of structural materials, suppression systems, smoke and heat control, detection, warning and how these parameters are used in the development of a fire safety engineering solution
5. Analyse a range of fire scenarios and apply fire science to interpret and develop fire safety engineering solutions

Subject Content

Fuels and the combustion process
Chemistry of combustion in fire
Flammability limits
Premixed flames
Diffusion flames
Flames from natural fires
Fire plumes

Burning of gases and vapours
Burning of liquids
Burning of solids
Smouldering combustion
Flaming combustion
Self-induced ignition
Piloted and non-piloted ignition
Propagation of smouldering and flaming combustion
Growth to flashover
Flashover
Post-flashover fires
Fire resistance
Spread of fire from a compartment
Production and measurement of heat, smoke and toxic gases
Methods for assessment of fire behaviour

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group	Mandatory Task
Numerical Problem Solving	Analytical, 2000 words equivalent, individual.	20	N	Individual	Y
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Quiz	30 multiple choice questions, individual.	10	N	Individual	Y
Final Exam	2 hour exam	30	N	Individual	Y

Prescribed Texts

- ABCB, 2005, International Fire Engineering Guidelines Edition 2005, Australian Building Codes Board, Canberra.
- Drysdale, D., 2011. An Introduction to Fire Dynamics, 3rd edn, John Wiley and Sons, Chichester, UK.

Teaching Periods

Autumn (2025)

Online

Online

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View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ENGR7007_25-AUT_ON_2#subjects)