

Ciências ULisboa

Faculdade
de Ciências
da Universidade
de Lisboa

DISCIPLINA MIEEA 2019



Technologies of combustion

Calendário escolar

Horas	Segunda	Terça	Quarta	Quinta	Sexta	Sábado
08:00 - 08:30		[4MIEEA01; 4MIEEA02] [8 2 39] [PL] PL21				
08:30 - 09:00						
09:00 - 09:30						
09:30 - 10:00		[4MIEEA01; 4MIEEA02] [8 2 39] [TP] TP21				
10:00 - 10:30						
10:30 - 11:00						
11:00 - 11:30		[4MIEEA01; 4MIEEA02] [8 2 39] [T] T21				
11:30 - 12:00						
12:00 - 12:30						
12:30 - 13:00						

- Low cost and high cost pollutants sensors
- Theory and practical examples
- Theory and practical examples

Calendário escolar/exams

2.º Semestre

Início	18 de fevereiro de 2019		
Período de aulas	18-02-2019	a	31-05-2019
Férias de Carnaval	04-03-2019		06-03-2019
Férias da Páscoa	17-04-2019		23-04-2019
Pausa letiva	01-06-2019	a	04-06-2019
Exames de Época Normal	05-06-2019	a	21-06-2019
Pausa letiva	22-06-2019	a	24-06-2019
Exames de Recurso	25-06-2019	a	06-07-2019
Exames de Época Especial	16-07-2019	a	23-07-2019
Férias de Verão	27-07-2019	a	01-09-2019
Época especial de conclusão	Até 30 de setembro de 2019		

Calendário escolar/exams

1ª Época 05-06-2019 Qua 16:30:00 19:30:00	1.3.14 1.3.15 miEEA
2ª Época 25-06-2019 Ter 16:30:00 19:30:00	1.3.14 1.3.15 miEEA
É. Especial 16-07-2019 Ter 09:00:00 12:00:00	6.1.25 miEEA

Corpo docente

Carla Silva (Teóricas e práticas) /Theory and practice
camsilva@ciencias.ulisboa.pt

Content

Introduction to combustion, definition, applications, world fuels and projections, problems of combustion

Thermochemistry: stoichiometry, chemical reactions, mass and molar concentrations, CO₂ emissions estimation

Thermochemistry: Heating value, chemical equilibrium, flame temperature

Fuels and properties, examples

Ignition- spontaneous and forced, examples Internal combustion engine

Flame types: pre-mixture, diffusion , laminar and turbulent, examples Internal combustion engine

Liquid fuel and solid fuel combustion, examples internal combustion engine, power plants

Pollutant control/standards

Pollutant control/standards

Pollutant formation and estimation

Pollutant formation and estimation

Internal combustion engine

Biomass/Coal/combined cycle natural gas Power plant

Biogas Power plant

Evaluation: By assignments & exam

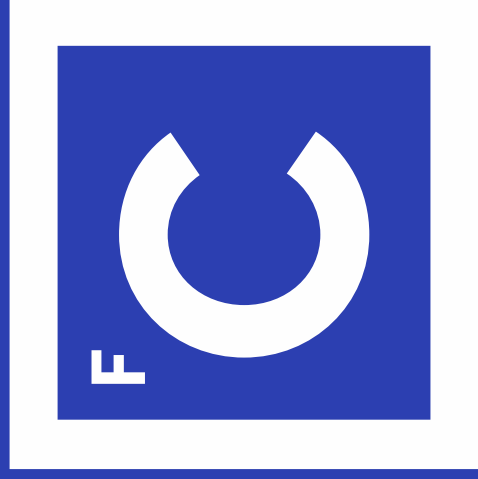
1st Assignment	30 %
2 nd Assignment	30 %
Exam (minimum 10 values)	40 %

At the end you should:

- ✓ Know the contribution of combustion to world energy generation and its contribution to emissions;
- ✓ Distinguish between local and global emissions;
- ✓ Know typical values of energy efficiency and typical emission factors e.g. $\text{g}/(\text{kWh}_{\text{electricity}})$; g/km ; $\text{g}/\text{MJ}_{\text{heat}}$;
- ✓ Know the main combustion technologies, advantages and disadvantages and potential for improvement;
- ✓ Know how internal combustion engines work;
- ✓ Know how a gas turbine work;
- ✓ Estimate emissions from thermoelectric powerplant and compare with regulation;
- ✓ Propose measures to minimize emissions.

1. **Pedro Coelho e Mario costa. Combustão. 2012.Edições Orion.**
2. Stephen R. Turns. An introduction to combustion. Concepts and applications. 1996. McGraw-Hill.
3. EMEP/EEA air pollutant emission inventory guidebook – 2013. European Environment Agency.
4. John Heywood. Internal Combustion Engine Fundamentals. 1988. McGraw-Hill.
5. M.K. Gajendra Babu,K.A. Subramanian. Alternative Transportation Fuels: Utilisation in Combustion Engines. 2013. CRC Press.

Thanks



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