



# Indian Institute of Technology

## Course Details Report

**Course No: OE5530**

**Course Name: Fire Resistant Design Of Structures**

**Course Type:**

Theory

**Description:**

To make the students familiarize with Fire-resistant design of structures with application to Industrial and offshore structures using Indian and International design codes

Learning outcomes:

On the successful completion of the course, students will be able to understand the design approaches for fire resistance. Gain knowledge about material properties at elevated temperatures. They will learn about fire, blast, and explosion characteristics that are quite common in heavy industrial structures, process plants, and nuclear reactors. The course contents will help to compute accidental loads that arise from fire, blast, and explosions using Indian and International codes.

**Course Content:**

Fire chemistry- classification of fire- types of fire-suppression systems- Extinguishers and fire-fighting systems

Explosion chemistry- types of explosions- computing damage from explosions- numeric examples- Matlab programs- Industrial explosions- control and mitigation- safety perspectives- flammability diagrams

Fire load- Fire limit state- code guidelines- design philosophy- discussions from international codes, National Building codes- Fire safety guidelines- planning guidelines for fire safety

Numerical model of blast loads- an estimate of blast loads- design for blast loads

Review of design procedures under conventional loads- accidental loads- design approach- fire-resistance- concrete structures- steel structures- design examples

Fire protection and suppression systems- types- extinguishers- accidental case studies- lessons learned from case studies- layout of fire-fighting systems

**Text Books:**

H.L.Malhotra. 1982. Design of fire-resisting structures, Surrey University Press, pp. 226, ISBN: 9780412001215

J.A.Purkiss. 1996. Fire Safety Engineering Design of Structures, Butterworth-Heinemann, pp. 342, ISBN: 9780750606097

Srinivasan Chandrasekaran, and Gaurav Srivastava 2017. Design aids for offshore structures under special environmental loads including fire resistance, Singapore ISBN 978-981-10-7608-4.

**Reference Books:**

Srinivasan Chandrasekaran. 2019. Advanced steel design of structures, CRC press, Florida, ISBN: 978-036-72-3290-0.

Srinivasan Chandrasekaran, Arvind Kr. Jain Nasir Shafiq M. Mubarak A. Wahab 2021. Design aids for offshore platforms under special loads, CRC press, Florida, pp. 280, ISBN: 9781032136844.

Srinivasan Chandrasekaran. 2022. Offshore Structures Under Special Environmental Loads Including Fire Resistance, Video course on MOOC, [https://onlinecourses.nptel.ac.in/noc22\\_oe01/preview](https://onlinecourses.nptel.ac.in/noc22_oe01/preview)

Srinivasan Chandrasekaran. 2016. HSE for offshore and petroleum engineers-Practices, Video course on MOOC at NPTEL Portal, <https://nptel.ac.in/courses/114106042>